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Big Sky Clearwater

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FALL 1995

BENEFICIAL REUSE: Making the Most of a Mostly Wasted Natural Resource

Wastewater Treatment Plan Effluent Used to Irrigate Cropland

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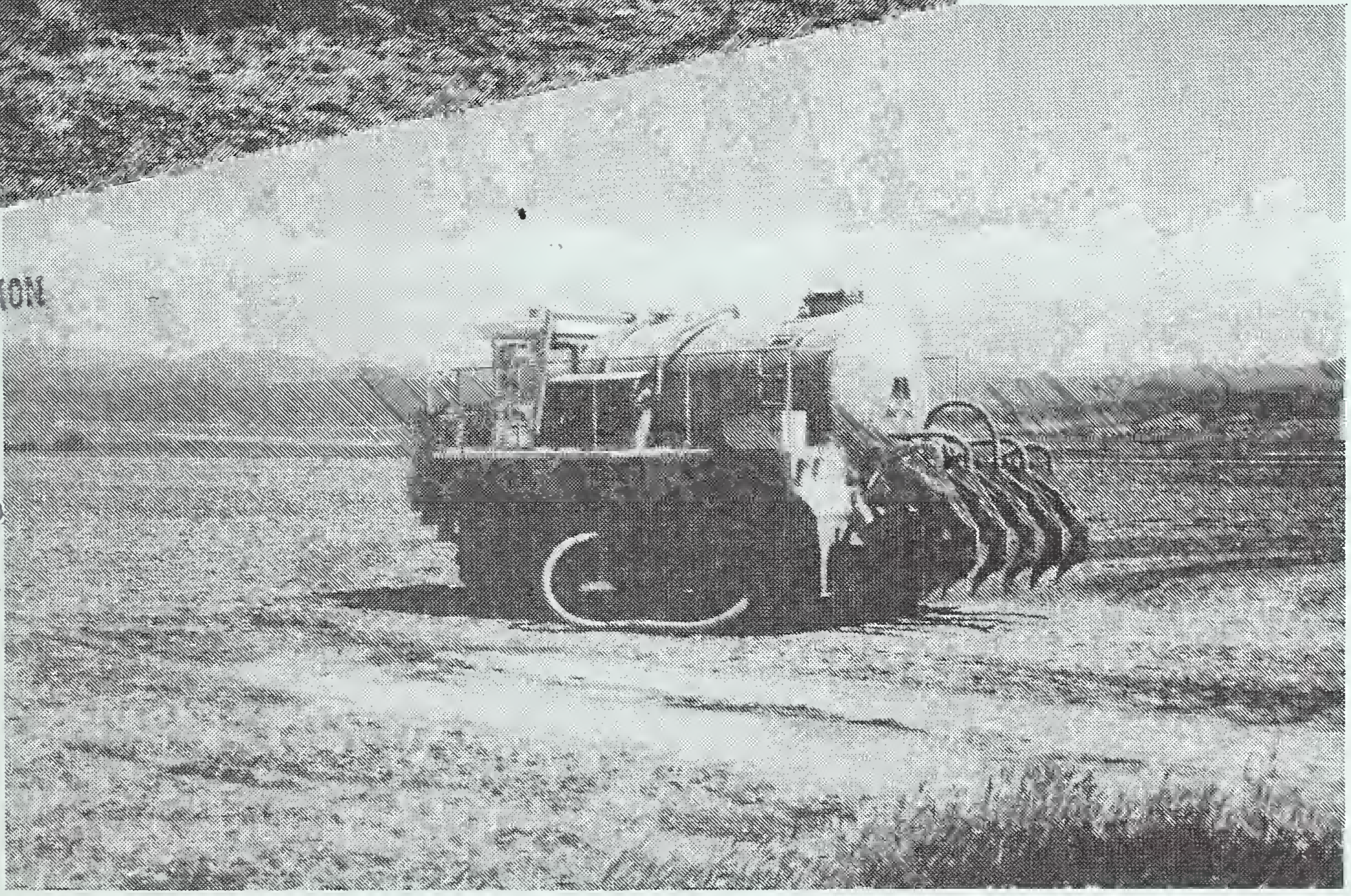

Biosolids Land Application Site Increases Crop Yields

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This publication welcomes articles of interest and random pieces of information regarding anything to do with water. If you have ideas or information you would like to share with other people involved in the water and wastewater field, please contact the Water Quality Division.

An article may consist of your thoughts and ideas about something you may have experienced, perhaps such information could help someone else in their day-to-day work. It could also be a technical article developed from research information and library resource material. If it has to do with water and you think it may be of interest, please send it to us (Attn: Editor) or give us a call at (406) 444-2406.

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Cover photos: *(Top)* Irrigation of treated wastewater from the Eastgate Subdivision in the Helena Valley. *(Bottom)* Land application of biosolids from the Helena WWTP.

The *Big Sky Clearwater* is for water and wastewater operators across Montana. It is published twice a year by the Water Quality Division, of the Montana Department of Environmental Quality, in cooperation with the Montana Section of the American Water Works Association and the Montana Water Environment Association.

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Educating Tomorrow's Environmental Leaders

by Luella Schultz, WQD

The Department of Environmental Quality, Water Quality Division has been the coordinator for the Water Education Calendar poster contest in Montana for three years. In addition to adult training routinely offered by the WQD staff, this is one of several grade K-12 educational opportunities in which the WQD participates. The WQD also has free pamphlets on water use and water saving practices and water education videos that can be checked out.

The Water Education Calendar poster contest is sponsored by the International Office of Water Education at Utah State University in Logan, Utah. The International Office of Water Education was established in 1983 to promote water/science education. They have developed educational books which contain water-related classroom experiments and lessons, and also developed the Water Education Calendar to promote water education in the classroom on a day-to-day basis.

The Water Education Calendar has more than 100 water-related questions, water facts, a resource list for more educational materials, and the colorful posters developed by students in classrooms throughout the U.S.

Two of the students from Montana will have their posters and a photograph of them with Governor Racicot featured in the Water Education Calendar. This year's winners (pictured with Governor Racicot below) are:

Mariah Smith
Grade 3
Potomac School #11
Bonner, MT

and

Cody Winterholler
Grade 4
Independent #52
Billings, MT

BENEFICIAL REUSE

OF WASTEWATER TREATMENT PLANT EFFLUENT

by Todd Teegarden, WQD

Is it time for you to consider the advantages of this disposal method?

Beneficial reuse of wastewater effluent is logical in theory and relatively simple to accomplish under State of Montana rules. In addition, this wastewater effluent disposal method can help achieve new discharge permit limitations on nutrients and mass loadings.

Spray irrigation of municipal wastewater effluent is a preferred method of ultimate wastewater disposal. The benefits include: reuse of wastewater, which reduces the volume of other irrigation water needed; adds nutrients, primarily phosphorous and nitrogen, to crops, thus reducing the amount of commercial fertilizers needed; removes the effluent from a surface water discharge, which generally decreases adverse water quality impacts to the receiving stream; and a surface water MPDES discharge permit is not required from the State of Montana. Beneficial reuse by spray irrigation is also considered a nondegrading discharge solution under the recently adopted state Nondegradation Law.

The most commonly used form of beneficial reuse in Montana is spray irrigation on cropland. There are many systems in the state using the irrigated effluent to bolster crop yields and avoid discharge permits under the Montana Pollutant Discharge Elimination System (MPDES). Some systems spray on privately contracted cropland, some on land owned by the wastewater treatment system and some onto state owned lands. Other application sites include a golf course and a reclamation area.

The limitations to land application are spelled out under the guidelines for quality of effluent, appropriate land application rates, distances from public access and other rules. The process can be facilitated through the Department of Environmental Quality, Municipal Wastewater Assistance Program.

Another form of a nondischarging system is Infiltration Percolation, also called a rapid infiltration system. This municipal wastewater effluent disposal system ultimately puts the effluent back into the ground water of the state, and does not derive a beneficial use of the wastewater and its nutrients. By safely applying well treated wastewater to various crops, parks, golf courses, ski areas, and other sites, we can reap the advantages of using a natural resource beneficially that is, for the most part, considered harmful to state waters, and is lost to our use at the point of discharge (see accompanying and article regarding Lakeside's award-winning spray irrigation system).

Inspecting the Lakeside Wastewater Treatment Plant spray irrigation system. This system has **successfully** grown hay, grain, and mint crops.

Lakeside, Montana has been awarded First Place in EPA Region VIII for Operation & Maintenance Excellence for 1995. They are currently under consideration for the national EPA O & M Excellence Award. Beneficial reuse of their effluent was a key consideration in nominating this well-run system for the award.

CONGRATULATIONS LAKESIDE!!!

LEGISLATURE ABOLISHES THE MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

by Steve Pilcher, Administrator, WQD

Yes, it is true, but before all of you start celebrating excessively, let me tell you, as Paul Harvey would say, "**the rest of the story**".

During the last couple of years, a group of individuals has been actively working, at the request of the Governor, on ways to re-invent government and make it more responsive to the needs of the people. The Re-new Task Force, as it was called, had several committees assigned to address different areas of state government. One of those committees was directed to review the way in which the state managed natural resource issues. They spent over a year evaluating Montana's existing programs, looking at other states and how they managed natural resources, and made recommendations to Governor Racicot.

Those recommendations were contained in Senate Bill 234 which successfully made it through the 1995 session of the Montana legislature. Senate Bill 234 marks the first significant state agency revision since 1972. Basically, the legislation takes three existing agencies having regulatory responsibilities in the natural resource area, the Department of State Lands (DSL), the Department of Natural Resources and Conservation (DNRC), and the Department of Health and Environmental Sciences (DHES) and creates two agencies. Those agencies are a new DNRC and a **Department of Environmental Quality (DEQ).**

The new DNRC will include most of the programs currently administered by the existing DNRC but will now also include the land management functions currently administered by DSL. The DEQ will combine the Water Quality Division, Waste Management Division, Environmental Remediation Division, and Air Quality Division from DHES with the Energy Division from DNRC and the Mine Reclamation Division from DSL (see following division descriptions). Health programs in DHES are transferred to a new Department of Public Health and Human Services.

Named to manage what is without a doubt the top regulatory agency in state government is Mark Simonich. Mr. Simonich previously served as director of the DNRC. Mr. Simonich has stated his goal is to bring balance to regulatory responsibilities and to provide for regulation through a system of service and solutions. Placing all regulatory environmental permitting in one agency instead of three should allow better coordination of the permitting process. Given these responsibilities, Mr. Simonich has indicated that you have to be tough, but you do not have to be mean. We all know that he is soon to face situations that will certainly put that to a test.

Most of you will see little immediate change from this reorganization, other than the new agency name. The reorganization didn't change any of the regulations or requirements and you will still be dealing with the same familiar faces in the Water Quality Division. During the next six months, the new director has indicated that he will be reviewing all of the programs within the new agency and will likely be making some additional organizational changes and we will share those with you as they develop.

Centralized Services Division: CSD does all the contracting, purchasing, accounts receivable and accounts payable, budgeting and financial reporting, computer support, and lab services for the department. It consists of the Information Services Bureau, which maintains the computer network; the Support Services Bureau, which oversees AR/AP, budgeting and financial reporting, purchasing and the mailroom, and the Laboratory Services Bureau, which operates the public health and chemistry labs.

Energy Division: The Energy Division regulates state energy projects. Formerly in the Department of Natural Resources and Conservation, it includes the Conservation and Renewable Energy Bureau, which promotes energy efficiency, the Facility Siting Bureau, which evaluates transmission lines, pipelines and other energy projects, and the Planning and Analysis Bureau, which identifies and evaluates energy issues that could significantly affect Montana.

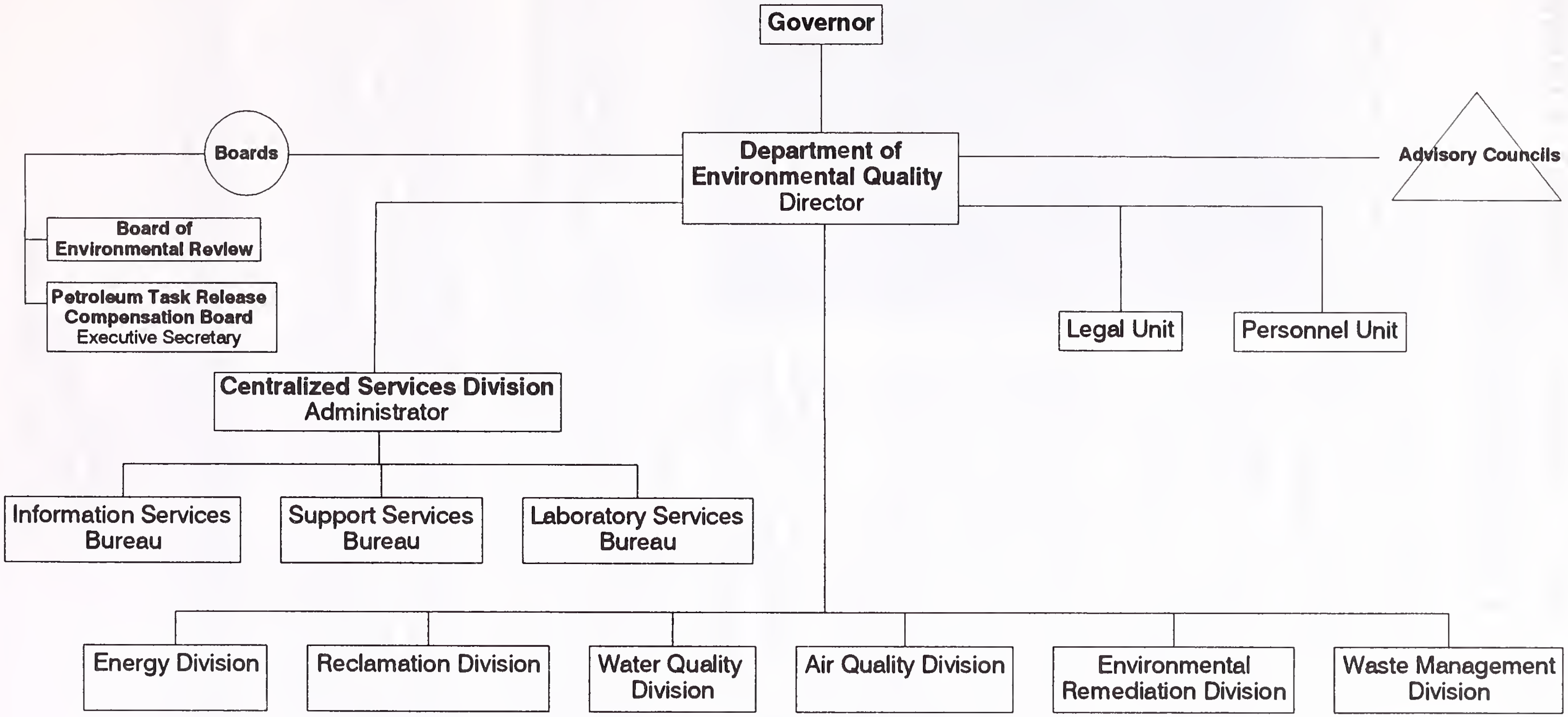
Reclamation Division: This division, which came to the DEQ from the former Department of State Lands, is responsible for regulating mine permitting and reclamation. It consists of the Hardrock Bureau, which regulates the mining and reclamation of gold, silver, industrial metals, chromium, precious stones, barrow material, topsoil and peat; the Open Cut Bureau, which regulates mining and reclamation of sand, gravel, scoria, phosphate rock, and bentonite; the Coal and Uranium Bureau, which regulates mining and reclamation of coal and uranium, and the Abandoned Mine Bureau, which identifies, prioritizes and reclaims abandoned mines.

Water Quality Division: The WQD has seven sections: Public Water Supply/Subdivision, which regulates public water systems and reviews subdivisions; Ecosystems Management, which monitors the water quality of lakes and streams; Enforcement, which investigates alleged violations of water quality laws; Municipal Wastewater Assistance, which helps communities with wastewater treatment issues; Permits, which evaluates and issues discharge and groundwater permits; Groundwater, which monitors water quality related to groundwater, stormwater and wellhead protection, and Technical Studies & Support, which addresses water quality standards issues and evaluates mine operating permits relative to water quality.

Air Quality Division: The Air Quality Division monitors air quality, permits and inspects sources of air pollution, and generally enforces air quality laws. It also includes the Occupational and Radiological Health Bureau, which regulates sources of ionizing radiation and related contaminants in workplaces, and tracks and mitigates radon, asbestos and radioactive materials.

Environmental Remediation Division: This division includes the Leaking Underground Storage Tank Program, which identifies and cleans up releases of petroleum products or hazardous substances from under- or aboveground tanks and piping, and the Superfund Program, which oversees the cleanup of state and federal Superfund sites.

Waste Management Division: The WMD consists of these four programs: Hazardous Waste, which regulates hazardous waste handling and disposal; Solid Waste Management, which permits and inspects landfills and other waste disposal facilities; Motor Vehicle Recycling and Disposal, which handles the recycling of junk vehicles, and Underground Storage Tank Release Prevention, which regulates underground storage tanks and piping.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Board of Environmental Review
Petroleum Task Release Compensation Board Executive Secretary
Department of Environmental Quality Director
Advisory Councils
Legal Unit
Personnel Unit
Centralized Services Division Administrator
Information Services Bureau
Support Services Bureau
Laboratory Services Bureau
Energy Division
Reclamation Division
Water Quality Division
Air Quality Division
Environmental Remediation Division
Waste Management Division

Organization Chart
Dept. of Environmental Quality
Director
Governor

MONTANA WETLANDS COUNCIL FORMED

by Jeff Ryan, WQD

It has been estimated that over half of our nation's original wetland acreage has been lost to development and conversion to cropland. Wetlands in Montana were not immune and many, almost one third - 300,000 acres - suffered the same fate.

A recent Environmental Protection Agency grant to the State of Montana gave the lead to the Montana Department Environmental Quality, Water Quality Division to develop a state wetlands conservation strategy. This program will provide for the development and implementation of a state wetlands strategy.

Montana currently has no mechanism to coordinate all the activities and programs of different agencies and user groups that may protect wetlands or be impacted by wetland regulation. It is our goal to develop and begin implementation of a strategy that will clearly define the role(s) of each agency in administering regulatory and non-regulatory programs, examine the effectiveness of existing programs for the protection and improvement of wetland resources, identify opportunities to help existing programs work better without the need for additional regulation or bureaucracy, and propose changes for those found to be inadequate.

A main emphasis of the strategy is to use a consensus building collaborative approach and numerous efforts have been made to involve the public/interest groups in the process. Strategy sponsored wetland summits, involving participation of over 100 individuals representing more than 30 different agencies and interest groups, resulted in the suggestion to convene a "Wetlands Council".

There is no formal membership in the Wetlands Council. Participation is open to the public, tribes, agency personnel, and interest groups. The Wetlands Council is not a policy-making organization. It is an advisory group to help direct the development and implementation of a Montana Wetlands Conservation Strategy.

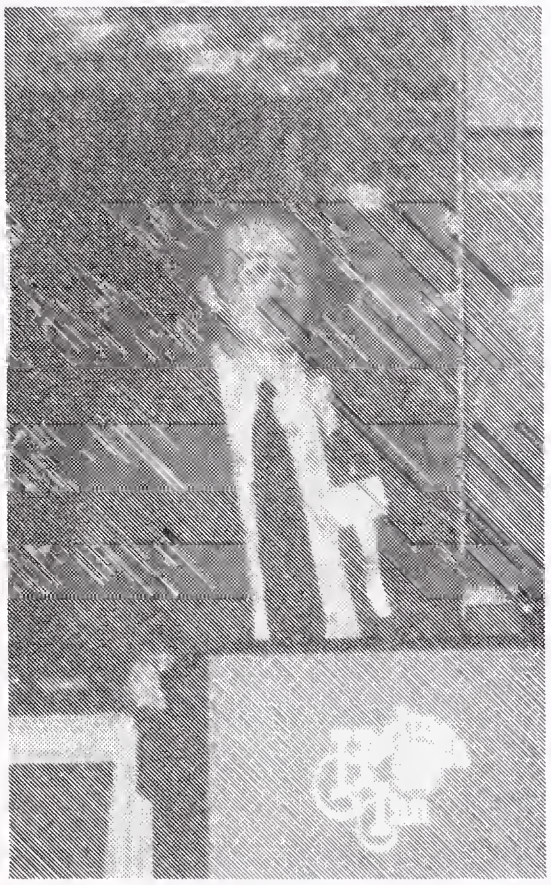
The strategy process will continue and with it a greater recognition by the development community, through their involvement in the strategy and the Wetlands Council, that their interests are of equal importance as the wetland protection groups' interests. The continued association of these diverse interest groups and partnering efforts will develop even greater wetland protection without unduly impacting Montana's economic environment.

For more information about the Wetlands Council and Montana Wetlands Conservation Strategy call Jeff Ryan, State Wetland Coordinator, at (406) 444-4626 or 444-2406, or write:

Jeff Ryan
DEQ/WQD
P.O. Box 200901
Helena, MT 59620-0901

Bedell Award

presented to Scott Anderson



Scott Anderson, who supervises the Municipal Wastewater Assistance Program of the Water Quality Division, Department of Environmental Quality, received the Arthur Sidney Bedell Award at the annual meeting of the Montana Water Environment Association (MWEA) held recently in Great Falls. This prestigious award is presented every three years to an individual selected by the association membership and honors extraordinary service to the principles of the MWEA and its parent organization, the Water Environment Federation.

Sidney Arthur Bedell was a leader in developing and promoting sound wastewater treatment practices in the United States early in this century. The Bedell Award was first presented in Montana in 1950 to Dr. Herbert Foote.

Scott has just completed a term as secretary-treasurer of MWEA and has served in all executive board positions, including president of MWEA. He has been a Water Quality Division employee since June of 1978. He is responsible for overseeing the Municipal Wastewater Assistance Program which includes the State Revolving Fund (SRF) loan program to finance wastewater infrastructure projects in Montana. Scott was instrumental in obtaining funds to establish the Montana Environmental Training Center (METC), a wastewater/water operator training center for Montana.

REDIRECTION PROCESS CONTINUES WITH EPA!

The U.S. Environmental Agency (EPA) continues to hold stakeholder meetings as part of its agency redirection effort. These meetings were initiated in March and continued in April and May. This is a result of pressure by Congress to reduce the number and complexity of its environmental regulations. Those participating in the meetings, by presence or by conference call, are composed of industrial organizations such as AWWA, state drinking water programs, environmental groups such as the National Resources Defense Council, and other interested parties. Issues under examination at these meetings fall into the following categories:

Regulatory Reassessment - EPA, appreciating that it hasn't the resources to proceed with work on all regulations concurrently, hopes to come to agreement on how to prioritize its regulation development. States have expressed feelings that Radon and Arsenic have a low priority, based on cost-benefit, implementation consideration, and analytical methods.

Scientific Data Needs - Exactly what data is required for EPA to make sound regulatory and program decisions, to include the impact of the regulatory requirements on costs to small systems, standard setting, and monitoring of contaminant decisions.

Implementation Improvements - How exactly the states should prioritize their implementation of regulations of the SDWA requirements, knowing that the resources of manpower and funding would restrict most states, if any, to fully and adequately implement all requirements.

Small System Viability - Exploring what steps could be taken to help prevent non-viable water systems. In addition, what can be done to make those already under the non-viable status to become viable. Viability suggests the ability to operate and maintain the system in such a way that it complies with all state and federal regulations at a fee affordable to its users.

Treatment Technology - Exploring the implementation and use of new treatment technology or the best criteria to use for specifying use of existing technology.

Health Assessments - This will review the procedure for how Maximum Contaminant Level Goals (MCLG's) are set, along with risk assessment modeling for carcinogenic and the non-carcinogenic contaminants.

Source Water Protection - How to develop such a program, and how will this program merge with wellhead and ground water protection programs.

Based on consensus of the committee and their staff members, EPA will develop an action plan based on its resources. The National Drinking Water Advisory Committee will review the final plan and the final decisions will be made by Bob Perciasepe, Assistant Administrator for Water. Although some priorities may conflict with court-ordered and congressional mandates, the complete impact of this redirection process will not be seen until the reauthorization of the Safe Drinking water Act.

(Information for this article excerpted from the Association of State Drinking Water Administrators' Update and AWWA's Opflow.)

Package Plant Policy Published by Water Quality Division

by Pat Burke, WQD

The Water Quality Division recently published a document entitled "Policy on Package Wastewater Treatment Plants." The package plant policy was developed in response to the growing number of package plant submittals received by the state during the past year, along with the history of performance problems which have been experienced at several package plants in Montana. The policy presents background information on existing package plant installations, policies of other jurisdictions, and typical problems that have been observed at package plant facilities.

In summary, the policy discourages the installation of package wastewater treatment plants, and lists the following requirements for package plant proposals:

- Where a package plant is proposed, other potential treatment options must be evaluated, including regionalization and less complex treatment technologies.
- Package plants must fully comply with the requirements of Circular WQB-2, *Design Standards for Wastewater Facilities* and other applicable rules.
- Proponents of package plant facilities must demonstrate the long-term financial viability of the package plant installation.
- Package plants must be staffed by appropriately certified operators.
- All package plant submittals must be prepared by a registered professional engineer.

Copies of the package plant policy may be obtained from Sara Williamson of the Water Quality Division at 444-2477.

Questions regarding specifics of the package plant policy may be directed to Pat Burke at 444-7343 or Scott Anderson at 444-5325.

1995 EPA O&M Excellence Award Winners

The **Lakeside Water and Sewer District** has received the EPA Region VIII Operation & Maintenance First Place Award for 1995. Lakeside is now being considered for the National EPA award for that size and category of system. Butch Forsyth, District Manager, and his staff deserve congratulations for doing a tremendous job in Lakeside. The District Board is supportive of system needs for training, safety and improvements. The system uses spray irrigation for beneficial reuse as ultimate disposal of their effluent.

The **City of Billings** was awarded second place in the EPA Region VIII competition for O&M Excellence. The Billings wastewater treatment facility, and plant manager, Dale Rongholt, are to be commended for placing so high in this extremely competitive category and size. The WWTP has made numerous improvements through the years to improve treatment and discharge of the city's wastewater. Extensive use of computer assistance, changes in the secondary portion and other improvements make this a truly innovative plant.

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Outstanding Speakers Coming to Montana

The annual Yellow Bay conference at the end of August will feature Dr. Michael Richard, a nationally renowned expert in wastewater lagoon treatment. Dr. Richard will address many issues relating to natural treatment systems, lagoon retrofits to improve treatment, cold-weather operation and others. Richards' focus will be toward advanced lagoon system operators and consultants who work with these systems and operators. All interested persons are welcome to attend what promises to be one of the more memorable conferences held in Montana.

Dr. Glenn Daigger, from Clemson University, will be featured at the 62nd Annual Water School for Operators and Managers this fall in Bozeman at MSU. Dr. Daigger commands national respect for his work with improving treatment in secondary treatment facilities through a variety of innovative approaches, including selectors for biological nutrient removal. All interested parties are welcome to come for just this one day at MSU, if you do not wish to attend the rest of the week.

History of the Safe Drinking Water Act

by Rick Cottingham, WQD

The Good Old Days?

In the late 1800's and early 1900's, waterborne disease outbreaks were common. The biggest concern was typhoid fever, although outbreaks of cholera and dysentery, amoeba and bacillary, also occurred. The average life expectancy in the United States was about 50 years of age. Montana had a major outbreak of typhoid fever (106 cases and 5 deaths) on the Milk River in 1907, numerous epidemics in 1916, and in Helena in 1928. In response to these outbreaks, the Montana Legislature passed the state's first drinking water legislation. There was concern over what could be done to limit the spread of waterborne diseases.

Filtration and disinfection, along with the elimination of sanitary defects, was the foundation of the public health protection program for public drinking water. A sanitary defect is any situation that allows contamination to come in contact with the water. Better management of human wastes was prompted by the recognition of disease transmission via water.

Developing Drinking Water Standards

In 1914, the United States Public Health Service adopted the first federal standards for drinking water. These standards were applied to the water sources for interstate carriers, most notably passenger trains, and primarily intended to prevent the spread of communicable diseases by drinking water. These standards applied to only 700 of the estimated 240,000 public water supplies in the U.S. Other than that, the standards were advisory only. Many states adopted all or parts of the standards, but they were limited in scope.

The early pioneers in the sanitation field developed bacteriological and chemical tests to give some indication as to what was in the water. These were called *monitoring tests*. The results of monitoring tests, combined with a survey of the waterworks, looking for sanitary defects, became the backbone of the regulatory efforts. The field surveys were called *sanitary surveys*.

Monitoring water to detect contamination by sewage or manure is based on the test for coliform bacteria. The main coliform bacteria of interest is Escherichia coli (E. coli). E. coli is found in the intestine of warm blooded animals and is eliminated with the feces. E. coli has several characteristics that make testing for it relatively simple. Therefore, it became the *indicator organism* for contamination and is the test that is still used today to indicate if our water is bacteriologically safe.

The early regulators knew that some chemicals were of concern. They knew that lead, arsenic, and selenium could cause developmental health problems such as reduced I.Q. levels, impaired learning and language skills, loss of hearing, and reduced attention span in children, along with fertility problems and miscarriages in women and high blood pressure in men. So the relatively few, then known chemicals of concern, were added to the standards list.

They were also concerned about turbidity in surface water because it was a measure of how well the water was filtered or how much crud was in the water which could protect disease-causing organisms from disinfection.

The drinking water programs continued from the early 1900's to the 1950's essentially the same. They were state programs concerned about things that had already made people sick, either heavy metals, chemicals, or organisms. The programs were simply extensions of the past and did not change much despite dramatic changes in the degree of environmental pollution occurring at the same time.

In the 1960's the public became environmentally conscience. Federally, Congress moved the water pollution control program out of the Public Health Service and put it in a separate agency. A study completed in the 1960's showed a lack of trained operators, sporadic monitoring, and intermittent surveillance programs that had left drinking water supplies in poor condition and of questionable quality.

In 1970, we celebrated our first Earth Day and Richard Nixon used his executive reorganization powers to create a new Environmental Protection Agency. The new EPA was not to be a scientific, research oriented, technical assistance minded agency. It was to be a *regulatory agency*.

The environmental concerns seemed to accelerate in the 1970's as a result of such instances as the heavy mercury detection in fish in the Great Lakes and a news media coverage of a major oil spill off the coast of Santa Barbara, California. Public uproar was targeted at substances that caused birth defects, spontaneous abortions and cancer. Reported disease outbreaks and some deaths, along with the possibility of chronic health effects from organic chemicals, asbestos, and heavy metals were recognized.

In 1972 the Clean Water Act was passed in response to public pressure for the government to take action. This placed the federal government in the regulatory role for individual waste treatment discharges, significantly altering the state/federal roles in water pollution. It was amended in 1977 and again in the 1980's, each time tightening the requirements and increasing federal enforcement capability. The toxic acts started the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in 1972, and the Toxic Substance Control Act (TSCA) and Resource Conservation and Recovery ACT (RCRA) in 1976. These acts have been amended several times, each one tightening the requirements. The *Super Fund Program* was one of the amendments.

The Safe Drinking Water Act

Prior to 1974, the regulation of public drinking water was primarily a function of state government. In 1974, Congress passed the Safe Drinking Water Act (SDWA), which for the first time authorized the federal government to establish mandatory and comprehensive national drinking water quality standards. The goal of the SDWA is to ensure that the quality of the nation's drinking water is protective of public health.

The SDWA was intended to be a partnership between the local, state, and federal governments. SDWA regulatory requirements are administered jointly by the U.S. EPA and the State Drinking Water regulatory agencies. Generally, EPA is responsible for developing the national drinking water quality regulations and policies, while states are responsible for implementing and enforcing the federal requirements, along with any additional state-level standards such as those addressing water system operation, design, and permitting.

In 1986, Congress substantially amended the SDWA and thereby greatly increased the regulatory responsibilities of EPA and the states. The 1986 Amendments require EPA and states to develop and implement much more extensive regulations, especially in the areas of filtration, disinfection, contaminant monitoring, and ground water protection. To maintain primacy, the Department of Environmental Quality (DEQ) must adopt, implement, and enforce regulations no less stringent than the federal regulations.

Supplier and Operator Responsibilities

In 1988, Congress passed the Lead Contamination Control Act (LCCA) which further amends the SDWA to provide for additional safeguards against lead contamination of drinking water, particularly in schools and daycare centers.

This history of the Safe Drinking Water Act shows how drinking water regulations developed relatively slowly and only then in response to health threats that were known to exist. As a result of the SDWA implementation, the United States now benefits from having some of the highest quality water supplied to the public in the world. However, the disease-causing agents which formulated the regulations still occur and threaten our public water supplies.

Montana is no exception. We have had our share of waterborne diseases in the recent past. These include Giardia outbreaks in Missoula and Red Lodge in the 1980's, an outbreak of gastroenteritis in 1975 in Big Sky and an ongoing superfund site in Bozeman that initially was discovered by detection of solvents in a small public water supply.

Although the regulatory requirements of the SDWA define the minimum water quality expected from public supplies, the primary responsibility to update and maintain a safe drinking water system remains with the supplier. Owner or operator indifference may rapidly revert a water supply to the health-threatening scenario faced in past years.

Operator certification and training is very important to water and wastewater utilities and to operators themselves. Certification is a means of documenting an operator's competency while training gives operators the knowledge and skills needed to perform their jobs. Employers will hire certified and trained operators to manage the treatment process and the equipment that is used. Management needs to feel confident that their plants are operated and maintained properly on a daily and yearly basis. A certified and trained operator can identify unsafe situations and procedures and improve safety records.

Certification and training is very important to every Montana operator, from the Class 5 operator to the Class 1. The techniques, tests, and calculations needed to operate a simple well or a modern treatment plant are too complex to pick up through simple hands-on experience. Cross-connection control with the operation and maintenance for the distribution system requires more than the intuitive mechanical abilities that might have sufficed 25 years ago. With the ever-changing rules and regulations, it is essential that trained operators stay up-to-date with the drinking water quality standards and treatment requirements to protect the public's investment and health. The law requiring certification for operators of water supply systems and wastewater plants was passed in 1967 in order to protect the public health and safety and to protect Montana's waters. The law preceded any federal drinking water standards and the Safe Drinking Water Act. The Department of Health and the Montana Legislature saw a need for good operators. Montana then joined 14 other states with a program for mandatory certification. Now 45 states have mandatory certification for water operators and 47 states for wastewater operators.

Not just anyone has the skills to be an operator! Many changes have taken place since the first examination was given. With this in mind, the Certification Board which is now known as the Water and Wastewater Operators' Advisory Council, took written comments from operators, water supervisors, and the Water Quality Bureau and revised the operator certification program. Some of most recent changes are that applicants are now required to have a high school diploma or a G.E.D. certificate. Depending upon which type and size system you operate, there are certain classes that you may fall under. There is also a certain amount of experience that is required to become a certified operator after you have passed the exam. Without experience, an operator will be certified as a operator-in-training until he or she has met the experience requirements. A disciplinary rule outlines the conditions for revocation of a license when an operator has practiced fraud or deception, has not taken reasonable care, judgement or the application of his knowledge or ability was not used in the performance of his duties, or when an operator is incompetent or unable to properly perform his duties. No longer is the certification exam given orally. Continuing education credits have also been increased. The skills for an operator require continuously obtaining more knowledge and the ability to recognize serious problems that threaten health or the integrity of the system.

The rapidly changing water industry and new regulations have brought the need to increase the training sessions throughout Montana. Wellhead protection, lead and copper rule, Phase II and V rule, lower effluent turbidity standards, and filter turbidity monitoring are a few of the many changes taking place. The need for the operators, water superintendents, and public works directors to stay abreast of the fast pace will only enhance the public image of the water system.

The operation and maintenance of any system are not easy tasks by any means. Physical structures need manual maintenance and daily inspection if they are to function properly and endure any life expectancy. The responsibilities of the operator to meet public health, customer satisfaction, and compliance with regulations is a difficult task. In the end, it is the operator who takes the heat if something goes wrong.

Today the operation of water treatment facilities and the delivery of a bacteria-free product are subject to consumer lawsuits for violation of quality standards and other deficiencies. In the event that a public utility were involved in a civil action, properly maintained records and state-approved plans for correcting deficiencies are essential for providing an adequate defense.

BENEFICIAL USE OF BIOSOLIDS IN MONTANA

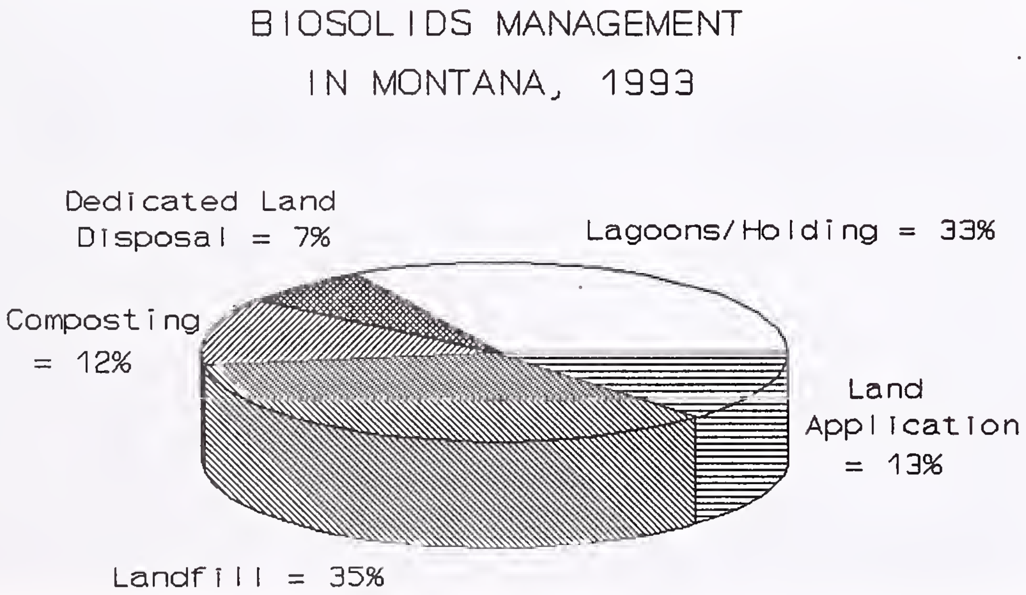
by Pat Burke, WQD

Montana has several excellent examples of beneficial use projects involving "biosolids" from wastewater treatment plants. What are biosolids, you may ask? According to the formal definition developed by the Water Environment Federation (WEF), biosolids are

> "A primarily organic solid product, produced by wastewater treatment processes, that can be beneficially recycled."

Paraphrasing, biosolids are wastewater sludges that have been treated to such a degree as required to meet regulations governing beneficial use through land application, composting, and other means. Biosolids must satisfy rigorous requirements related to metal pollutants, pathogens, and vector attraction reduction. Think of biosolids as high quality sludge materials that have hired a public relations consultant to help dress up their image and enhance their public acceptance. Public perception is the main reason that WEF has promoted the biosolids concept.

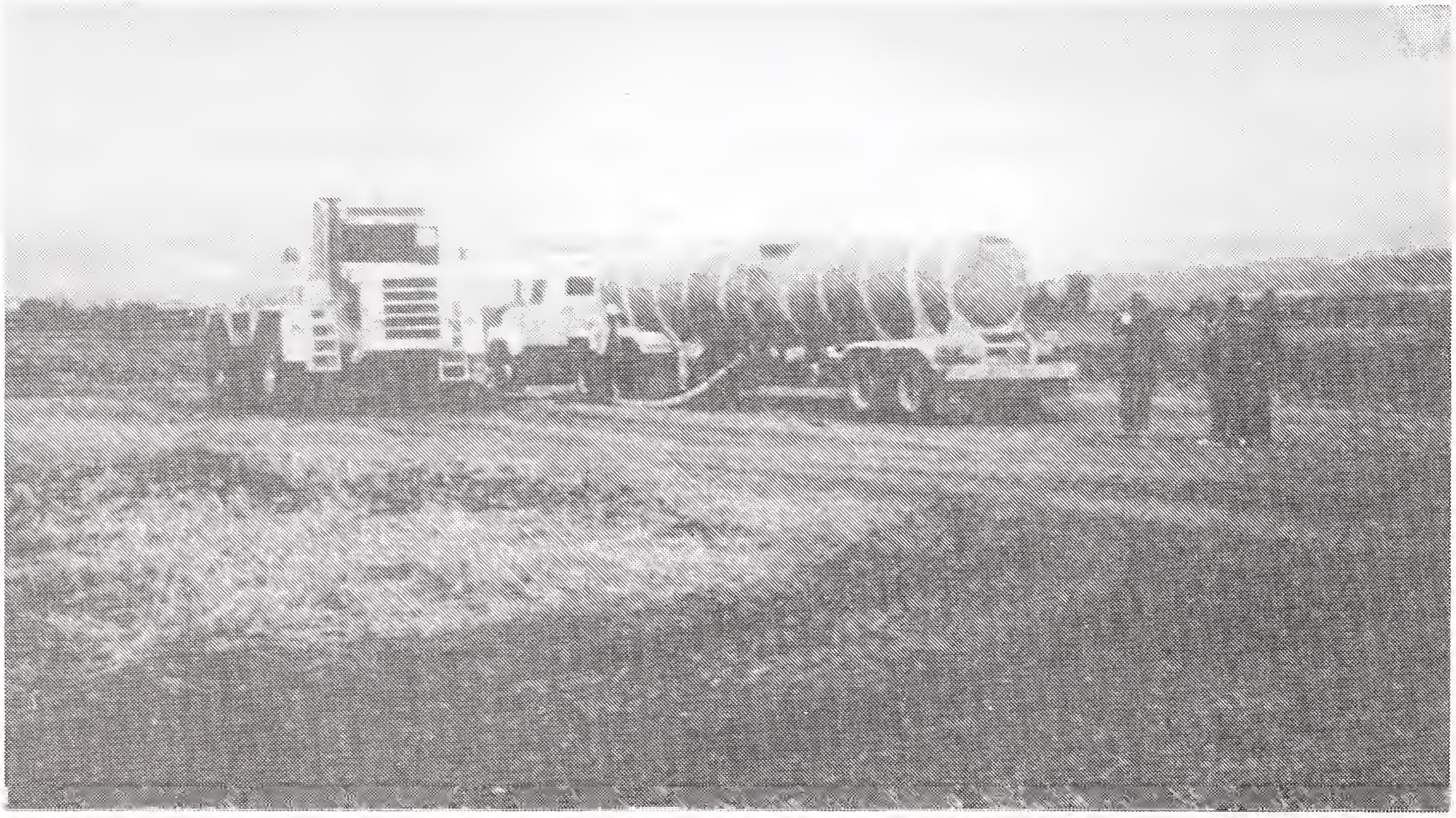
Each year, Montana's mechanical treatment plants and lagoon systems produce about 10,000 dry tons of wastewater solids. The largest proportion of these materials is deposited in lagoons (wastewater treatment lagoons as well as lagoons used exclusively for biosolids storage at mechanical plants). While many Montana communities have shown a strong interest in beneficial use, landfill disposal still ranks as a major means of biosolids management, as shown in the pie chart below.



As landfill space becomes more scarce and as tip fees rise over time, we anticipate that landfill disposal of biosolids will decrease.

Beneficial use through land application to agriculture, and composting at two privately operated facilities in western Montana (Ekocompost in Missoula; Glacier Gold in Olney) account for about 25 percent of the state's biosolids production. About seven percent of the state's biosolids production is managed through dedicated land disposal at the Butte Silver Bow site, essentially a high-rate surface application incompatible with growing crops. Butte's program is currently being modified to produce a lime stabilized, dewatered biosolids product that will be beneficially used as a landfill cover component and made available for land reclamation.

Bozeman, Helena, Livingston, Bigfork, and several other Montana communities rely on land application for biosolids management. **The Bozeman operation has been very successful, and they have received an EPA award in recognition of their program's achievements.** Bozeman's solids handling operations include thickening of raw primary and secondary solids, anaerobic digestion, and winter storage using two lagoon cells. Each year, beginning in late May or June (weather dependent) Bozeman land applies the lagooned biosolids to farm land in the Gallatin Valley. Application is performed by hauling the liquid biosolids to privately owned application sites using a 6,000 gallon tank truck. The biosolids, which typically average 1.5 to 2.0 percent total solids, are applied using a large, off-road injector vehicle, at a rate of 1 to 2 dry tons per acre. The biosolids provide about 100 pounds of plant available nitrogen per acre as fertilizer. Application sites are typically farmed in grain rotations, with biosolids injected onto fallow land. Crop yields following application have been excellent, and the current demand for Bozeman's biosolids exceeds the supply. In managing the program, Bozeman's staff maintains close communications with landowners and requires participants to enter into a legal contract with the City. **Congratulations to Bozeman on a job well done!**



Bozeman's land application program--
loading the injection vehicle from a 6,000 gallon tank truck

How does your community's solids management program compare with the Bozeman operation? We encourage you to submit an article on your biosolids handling activities for future editions of the *Clearwater*. How about applying for an annual EPA Biosolids Award? We would like to see more Montana communities take advantage of this excellent public relations tool and receive recognition for their work. For more information, contact Bill Bahr or Pat Burke of the Water Quality Division at 444-2406, or Paul Montgomery of the EPA Region VIII, Montana Office at 449-5486, extension 234.

METC News and Dews

by Jan Boyle

METC Training Coordinator

The **Montana Environmental Training Center** (METC) has been conducting water quality and environmental training and education programs for over five years now, and the successes achieved from these programs are due in large measure to those folks who participate in the programs, our attendees and our trainers. It never ceases to amaze me how some of these programs have inspired many of our workshop participants to become more involved in efforts to build awareness and support for water and environmental quality in their own communities. A large part of METC's constituency is the operators of large and small water and wastewater systems, also residents of their communities. I am always pleasantly surprised to receive a follow-up phone call to a workshop from a participant, an operator, who would like more information on educating their community in some water quality aspect. Sometimes this isn't always an easy task to accomplish since there is an element of resistance that tends to exist in some community situations. But just the fact that this person took **some action** to involve himself/herself in the process of community awareness of water issues and public health suggests to me that METC is on the right path of training **and** education for our constituency. Community grassroots efforts toward solving water quality and environmental problems involve many folks - water and wastewater operators, community residents, water utilities, public officials, etc. Working together is a wonderful forum for problem-solving and the development of positive and creative solutions.

The dedication and commitment demonstrated by METC's trainers over the years have contributed immensely to the successes that the training center has experienced with their seminars and workshops. METC recognizes that a trainer's **expertise**, **experience**, and **desire to foster delivery** of information are crucial elements in successful delivery of training programs. We have been most fortunate to have and continue to have the support of a group of trainers that we can count on to deliver needed and pertinent water quality information of a technological, regulatory and educational nature. Our group of trainers is comprised of water and wastewater operators, managers, and administrators, engineers, consultants, water quality specialists, educators, regulators, financial experts, equipment representatives, and many other environmental training specialists. Again, the idea of working together increases the chances of finding solutions that benefit all water users and purveyors.

METC continues to experience growth, both in the number of workshops and seminars delivered in the 1994 fiscal year (35), the 42 scheduled for 1995, and in the hiring of another staff member. With the cooperative efforts of the Water Quality Division's Drinking Water Program, METC was able to fill a Training and Development Specialist position with the hiring of Barb Coffman. "Barb" comes to METC with a background in water quality technology, having graduated from Montana State University-Northern's Water Quality Technology four-year program. METC is pleased to have her on board!

Some Training Highlights:

- A "new" **Basic Water Science** workshop took place in Havre in 1994 in cooperation with MSU-Northern. Duane Klarich, science instructor, delivered the three-day course that took operators and other participants to a nearby stream where biological and physical analyses were assessed in determining the health of an aquatic system. Analytical techniques and corresponding data interpretations were completed in laboratory activities. Another Basic Water Science workshop is scheduled for July 1995.

- METC's **3rd Annual Spring School for Small Systems** took place in Miles City in March 1995. In an effort to bring training to eastern Montana operators, managers, and administrators of small systems, METC developed a traveling schedule that would include several eastern Montana locations for this event. Last year the school was held in Lewistown. Both locations provide excellent accommodations for this annual METC spring event. On-site field experiences at the water and wastewater treatment plants in Miles City and Lewistown provide a "hands-on" activity that is well received by those in attendance.

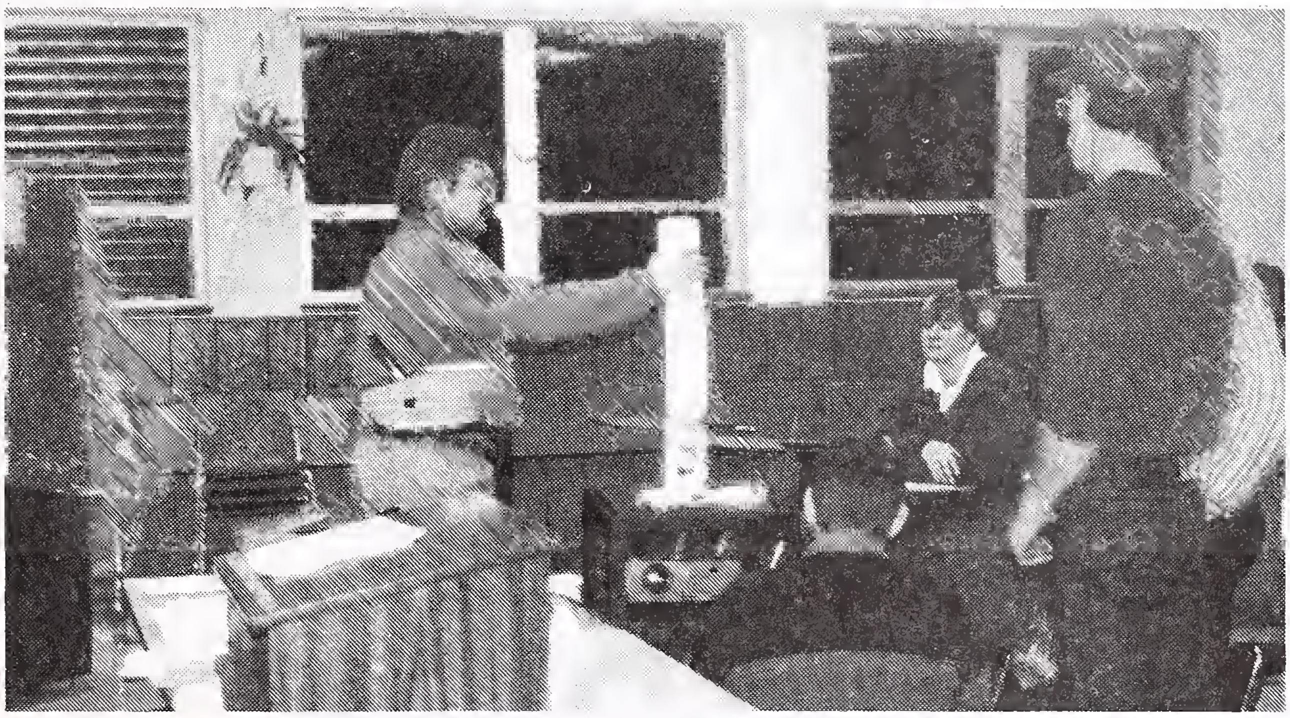
- The **61st Annual Fall School for Water and Wastewater Operators and Managers** (Bozeman) held in September 1994 found METC actively involved in the development of the School along with the Water Quality Division, MSU's Water Resources Center, and the College of Engineering. In addition, this Coordinator was involved in a collaborative venture with Mary Ellen Wolfe, of the Montana Watercourse, to deliver a presentation entitled, **"Into the Watershed: The Operator's Connection".** Operators and others in attendance were given an overview on watersheds as they relate to their own communities in which they live and the water and wastewater systems that they operate. METC will continue to be active in the development of future fall schools in Bozeman.

- Two advanced **Activated Sludge Microbiology/Troubleshooting** workshops were conducted in the summer of 1994, one in Billings, and the other as part of an annual METC advanced wastewater event at Yellow Bay's Biological Station on Flathead Lake. **Dr. Michael Richard**, RBD Engineering Consultants, delivered the course in Billings on practical control methods for activated sludge bulking and foaming. Dr. Richard is a co-author of the text used in this course. **Paul Klopping**, Environmental Training Consultants, delivered the Yellow Bay course. Both courses utilized the METC microscopes for identification of microorganisms and assessment techniques for the various sludge quality problems of **bulking and foaming**. Operators were actively involved in their learning, using prepared slides and wet mounts of sludge that represented the different samples brought in by the operators from their treatment plants. Another Yellow Bay advanced wastewater workshop is scheduled for August 1995. Dr. Richard will be delivering a topic entitled, "Design and Troubleshooting Lagoon and Wetland Systems".

As always, METC invites comments on training and training workshops, ideas for workshops, and welcomes visitors to the office. We are located at MSU-Northern at Great Falls, 1211 NW Bypass, Great Falls, MT 59404. Our phone number is 1-406-454-2728.

Photos from our 3rd Annual Spring School for Small Systems
Miles City - March, 1995

Turbiditymeter Standards and Calibrations Workshop



Safety Awareness Session

Miles City WWTP Tour

62ND ANNUAL

WATERSCHOOL

for Water & Wastewater Operators & Managers

WATER SCHOOL REGISTRATION FORM
SEPTEMBER 25-28, 1995

Name ______________________________

Employer ______________________________

Business Address ______________________________

Street ______________________________

City, State, Zip ______________________________

____

Business Phone ______________________________

Preregistration: $85.00 per person
On-Site Registration: $100.00 per person
Checks and Purchase orders should be payable to Montana State University.

Total amount enclosed: ______________________________

Method of payment:

☐ Check (payable to MSU)
☐ Credit Card *(card name)* ______________________________
Card Number ______________________________
Exp. Date ______________________________
☐ Purchase Order # ______________________________

THE WATER SCHOOL

The 62nd Annual Fall Water School will be held in Bozeman on September 25-28, 1995 at Montana State University - Bozeman. Water and wastewater examinations will be administered separately by the Water Quality Division Certification Office on Friday, September 29, 1995.

Two to four tracks will be run concurrently for water treatment and distribution and wastewater collection and treatment operators. It will be the individual operator's choice to select classes that relate to their particular professional or system needs. Some courses will be offered in joint session as they are applicable to all systems. Topics for this year include:

- Advanced Surface Water Treatment
- Water Distribution Operation and Maintenance
- Confined Space Entry
- Solids Handling and Discharge Permits
- Pumps and Motors
- Collection System Maintenance
- Communication Skills
- Chlorinator Operation and Maintenance
- Leak Detection
- Microbiology of Wastewater
- Chlorine Safety
- Coagulants and Polymers
- Advanced Wastewater Treatment
- Submersible Pumps
- Budgeting and Rate Setting
- Lagoon Operations

Please fill out and return with your Early Bird payment to:

Water School
Extended Studies
Montana State University-Bozeman
204 Culbertson
Bozeman MT 59717
(406)994-4930

JOINT MORNING SESSIONS: MONDAY, SEPTEMBER 25

TIME	BALLROOM A
7:30 AM	**Registration**
8:30 AM **0.05cec**	**Welcome and Introductions:** Jan Boyle, Montana Environmental Training Center; Warren Jones, MSU School of Engineering; Dorothy Bradley, Montana Water Center; Jim Melstad, DEQ Water Quality Division, Public Water Supply; Scott Anderson, DEQ/WQD Municipal Wastewater Assistance Program
9:00 AM **0.1cec**	**Operator Certification** Shirley Quick, WQD Certification Officer
10:00 AM	**Break**
10:15 AM **0.075cec**	**The State of Montana's Water Quality** The Honorable Governor Marc Racicot
	The First Certified Montana Wellhead Protection Plan - Clyde Park Awarded by Gov. Racicot
11:00 AM **0.05cec**	**Developments at the Biofilm Center** Dr. William Costerton
11:30 AM	**Lunch**

CONCURRENT AFTERNOON SESSIONS: MONDAY, SEPTEMBER 25

TIME	BALLROOM A	BALLROOM B	BALLROOM C
12:30 PM **0.15cec**	**Well Construction** Joe Meek	**Filters: The Integration Process** Jack Sampson	**Wastewater Treatment: Lagoons** Doris Roberts; Rory Schmidt
1:45 PM	**Break**		
2:00 PM **0.15cec**	**Wellhead Protection** Joe Meek	**Polymers & Coagulants** Mark Talbert	**Wastewater Treatment: Advanced Systems** Bill Bahr **0.15 cec**
3:30 PM	**Water School Vendor Show (Rooms 275/276)**		

CONCURRENT MORNING SESSIONS: TUESDAY, SEPTEMBER 26

TIME	BALLROOM A	BALLROOM B	BALLROOM C	ROOM 275
8:00 AM **0.175cec**	**EPA: Drinking Water Rules & Regs** (Proposed)	**Distribution, Maintenance & Maintenence** TBA	**Organism Selection in Activated Sludge Systems to Enhance Process Performance** Dr. Glenn Daigger	**Collection System Maintenance** Patti Townsend, PACE Construction
9:45 AM	**Break**			
10:00 AM **0.15cec**	Turbidity: Validations and Calibrations	**Valve & Hydrant Maintenance** Henry Elbrecht	**The Basics of Biological Nutrient Removal Systems** Dr. Daigger	**Alternative Collection Systems** TBA
11:30 AM	**Lunch**			

CONCURRENT AFTERNOON SESSIONS: TUESDAY, SEPTEMBER 26				
	BALLROOM A	BALLROOM B	BALLROOM C	ROOM 275
12:30 PM 0.125cec	CT Workshop	**Confined Space Entry** Sandra Stapler, DLI, Safety Bureau	**National Advanced Wastewater Case Histories** Daigger	**Metering and Telemetry in Treatment Plants** Balderston or Pippins
1:45 PM	**Break**			
2:00 PM 0.1cec	CT Workshop	**Confined Space Entry** Sandra Stapler, DLI, Safety Bureau	**National Adv. W.Wtr. Case Histories (cont)** Daigger	**Metering and Telemetry in Treatment Plants** Balderston or Pippins
3:00 PM	**Break**			
3:15 PM 0.175cec	Advanced Math	**Leak Detection** MRWS	**Montana Case Studies and Open Discussion** Daigger	**Basic Wastewater Microbiology and Microscope Lab** Dr. Anne Camper
5:00 PM	**Adjourn**			

CONCURRENT MORNING SESSIONS: WEDNESDAY, SEPTEMBER 27, 1995				
TIME	BALLROOM A	BALLROOM B	BALLROOM C	ROOM 275
8:00 AM 0.15cec	**Submersible Pumps** Gregg Luck	**Pumps & Motors** Chuck Pfiel	**Ultraviolet Disinfection** Patrick Burke **Biosolids/Pretreatment** Paul Montgomery	**Corrosion Control** Black & Veatch
9:30 AM	**Break**			
9:45 AM 0.125cec	**Cross-Connections** Marc Golz	**Chlorinator Operation & Maintenance** Dave Iacopini	**Sampling and Testing Techniques** John Hawthorne	**Corrosion Control** Black & Veatch
10:30 AM 0.1cec	**Off-site Session: Computer Applications to Operation & Maintenance** (Culbertson Hall) Kathy Stephens You must pre-register for these classes; limited space.			
11:30 AM	**Lunch**			
12:30 PM 0.1cec	**Off-site Session: Computer Applications to Operation & Maintenance** (Culbertson Hall) Kathy Stephens You must pre-register for these classes; limited space.			

	CONCURRENT AFTERNOON SESSIONS: WEDNESDAY, SEPTEMBER 27			
TIME	BALLROOM A	BALLROOM B	BALLROOM C	ROOM 275?
12:30 PM **0.125cec**	**Data Acquisition Systems** Tome Lye; Jim Harrison	**Budgeting and Rate Setting** Bill Leonard, MAP	**Surface Water Permits** Greg Wermers, WQD	**Corrosion Control** Black & Veatch
1:45 PM	**Break**			
2:00 PM **0.125cec**	**Distribution & Maintenance** TBA	**Budgeting and Rate Setting** Bill Leonard	**Ground Water Permits** John Arrigo	**Corrosion Control** Black & Veatch
3:15 PM	**Break**			
3:30 PM **0.15cec**	**No Sessions/Ballroom A**	**No Sessions/Ballroom B**	**Aeration Systems for Lagoons** TBA	**Corrosion Control** Black & Veatch

3:30 PM **OFFSITE SESSIONS: (0.15cec each)**

1) **Distance Learning (Culbertson Hall)** Kathy Stephens;

2) **Bozeman Wastewater Treatment Plant Tour** WWTP Staff;

3) **Bozeman Water Plant Tour** WTP Staff

5:00 PM	**Adjourn**

	JOINT MORNING SESSIONS: THURSDAY, SEPTEMBER 28	
TIME	BALLROOM B	BALLROOM A
8:00 AM **0.2cec**	**Handling Liquid & Dry Chlorine Compounds** Greg Peterson, Western Chemical	**Gaseous Chlorine: Safe Handling Procedures** Dave Iacopini, Blaine Ingram, Inc.
10:00 AM	**Break**	
10:15 AM **0.125cec**	**Safety & Health Concerns for Water and Wastewater Operators** Industrial Hygenist, TBA	
11:30 AM **0.025cec**	**Wrap-up:** **School Evaluations** **Closing Comments by School Director**	
11:45 AM	**Adjourn**	

Safety Doesn't Cost...Safety Pays

by Dean Chaussee, AWWA Education Committee

Have you had some close calls at work recently? Are you concerned about your poor safety record? Are some of your current work practices dangerous? Are you under the gun to develop a safety program for your utility? **In 1993, the National Safety Council reported that the water supply industry had the highest incidence of occupational injuries for utility companies -- surpassing electric and gas utilities combined.**

On **December 7, 1995**, the AWWA will present a teleconference on **"Water Utility Safety"**.

The teleconference program will:

- take a hard look at the financial, economic, and human consequences of water utilities not having an effective safety program
- examine the scope, elements, and implementation of an effective safety program (including regulatory compliance)
- look at case studies of successful water utility safety programs
- describe how to "sell" a safety program to your decision makers

Water utility resources are often focused more on issues that affect the public -- like safe drinking water -- and less on those that affect their employees -- like employee safety. Consequently, employee safety is underemphasized in many water utilities. Many utilities have a safety program which is only marginally effective. Some don't have a safety program at all!!

This information is critical. Put this date on your calendar now. Details will be announced later.

Fluoride on tap:
50 years of fluoridation in America

This year marks the 50th anniversary of a bold experiment in public health. In January, 1945, the cities of Grand Rapids, Michigan and Newburgh, New York, were among the first to begin fluoridating their public water supplies...but not without controversy.

At the time, advocates of fluoridation claimed it was a safe and cost-effective way to promote healthy teeth. Opponents were concerned about health risks and the ethics of fluoridating public water supplies. A few extremists even regarded fluoridation as a diabolical communist plot designed to "sap our precious bodily fluids."

Although the debate has never really ended, fluoridation has since become an accepted part of our lives. Today, more than 144 million Americans drink fluoridated water. Millions more brush their teeth with fluoridated toothpaste, rinse with fluoridated mouthwash and drink soft drinks and bottled beverages processed with fluoridated water. But of those untold millions, only a few really have a full understanding of the risks and benefits of fluoridation. Even fewer still know how it all started.

A tooth for a tooth.

Like many other scientific breakthroughs, the beneficial side effects of drinking fluoridated water were discovered almost by accident. In the early 1930s, researchers working in the Great Plains and Rocky Mountain states were investigating reports of a disfiguring tooth disease known as mottled enamel. In mild forms of the condition, teeth developed brown or yellow discoloration (mottling). In extreme cases, the teeth were severely stained, pitted, brittle and susceptible to fracture. After studying areas where mottling was endemic, they found a correlation between mottled teeth and excessive fluoride levels.

In a follow-up study a few years later, H. Trendly Dean, a dentist at the National Institute of Health, reported that people who grew up in areas where water naturally contained high levels of fluoride had fewer cavities (dental caries) than people living in areas with low levels of fluoride in the drinking water supply. Based on Dean's findings, public health officials were able to determine that a fluoride concentration of 1 mg/L effectively reduced the incidence of dental caries without increasing the incidence of mottled enamel.

60 percent fewer cavities.

Dean's research ultimately prompted the Public Health Service to develop a 15-year pilot study designed to evaluate the benefits of fluoridated water. For test sites, they selected Grand Rapids and Newburgh.

Most officials involved in the project believed fluoride would provide important benefits and had little or no health risks. After 11 years, scientists announced that the rate of cavities among children in the test sites had plunged 60 percent. Soon, every voice of authority, from the PTA to the American Dental Association (ADA) lobbied vigorously to promote fluoridation of public water supplies.

By the end of the 1960s, most of the nation's major cities were fluoridating their water. National surveys of children's oral health conducted during the early 1970s through the mid 1980s indicated a steady decline in dental carries. The most recent survey, conducted in 1986-87, found that American children had

36% fewer cavities than they did at the beginning of the 1980s.

Overall, the facts seem to vindicate Dean's hypothesis that fluoride is a safe and cost-effective way to promote dental health. In the last 20 years alone, rates of tooth decay among American children have fallen by half. Similar results are documented in the United Kingdom, Australia, Ireland, New Zealand and other countries where fluoridation is practiced.

How much is too much?

Few can dispute the beneficial impact of fluoride. According to the ADA, half of all children in the first grade have never had a cavity. But are there any risks to fluoridation?

Several studies in the last 15 years indicate that the prevalence of dental fluorosis (mottled enamel) is rising, especially in areas where the fluoride concentration in the drinking water exceeds the recommended 1 mg/L level. Researchers claim the high levels of fluoride in drinking water, combined with greater levels of fluoride in the food chain, are contributing to higher levels of dental fluorosis among children and teenagers.

A National Toxicology Program report released in 1990 even suggested there may be a link between fluoride and cancer. During a two-year experiment, rats and mice drank water with varying levels of sodium fluoride. None of the subject animals drinking fluoride-free water or water with low levels of fluoride developed cancer. But of the rats and mice drinking water with elevated levels of fluoride, several developed osteosarcoma.

Other studies have suggested that fluoridation may even be unnecessary. Researchers comparing fluoridated and unfluoridated communities in industrialized countries have consistently found that the rate of tooth decay among subjects in unfluoridated communities was as low as those in fluoridated communities---in part due to the availability of fluoridated toothpastes and rinses. Researchers also claim better nutrition and hygiene may account for the decline in tooth decay.

The great debate continues.

Any discussion of fluoridation is ultimately a balancing act of benefits and risks. But even if all evidence from fluoride research indicated that the associated risks are minimal or nonexistent, it's still unlikely that every interest group involved in the debate would be able to reach a consensus. In recent years, about six out of every 10 communities voting on fluoridation have rejected it, partly because fluoridation raises some very basic questions about the role of government in healthcare issues.

Some anti-fluoridation activists oppose fluoridation on the grounds that it violates individual choice. They view fluoride as medication, and view fluoridation of the public drinking water supplies as a form of forced medication.

Fluoride proponents, on the other hand, often invoke arguments about basic social justice. They claim that fluoridation promotes dental health for children of all socioeconomic classes, not just those with the resources to afford adequate dental care.

In the end, the question of whether to fluoridate or not to fluoridate has less to do with scientific assessment of risk and benefits, than with values and politics. It seems the real battles are destined to be fought in the editorial pages and not in the laboratory. But as long as the controversy lingers, there is one point that almost everyone can agree on---the importance of accurate fluoride analysis.

Reprinted from News & Notes *For the Analyst*
Vol. 19, No. 2, June 1995

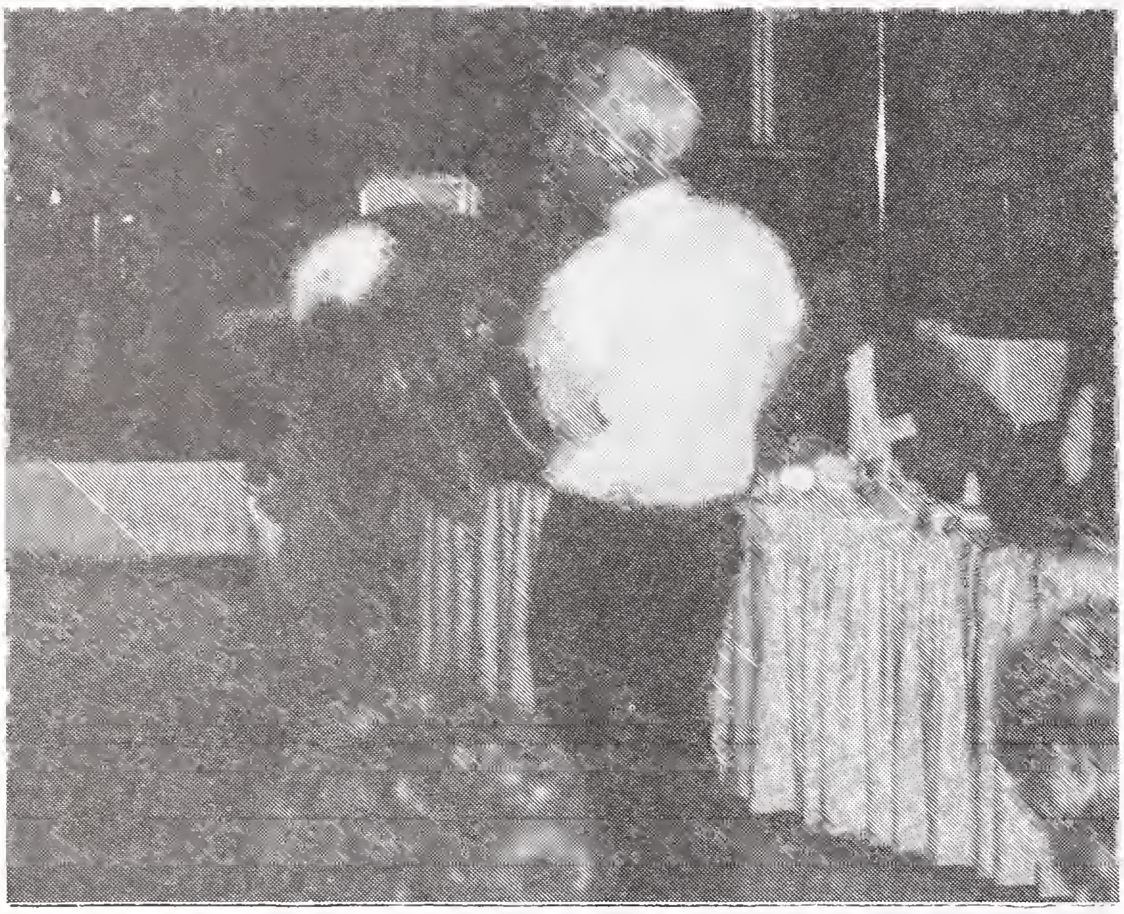
MSAWWA and MWEA
1995 Joint Annual Conference

The 1995 Joint Annual Conference of the Montana Section of American Water Works Association and Montana Water Environment Association in Great Falls on May 3, 4 and 5 was a large success. Nearly 150 people attended technical sessions, vendor exhibitions and entertainment functions. Featured Thursday banquet entertainment was Vince Yannone of the Montana Department of Fish, Wildlife and Parks. Vince educated and entertained the conference-goers with his wildlife critters and amusing anecdotes from his many experiences working at FW&P. Vince is retiring and we will miss him. Thanks, Vince!

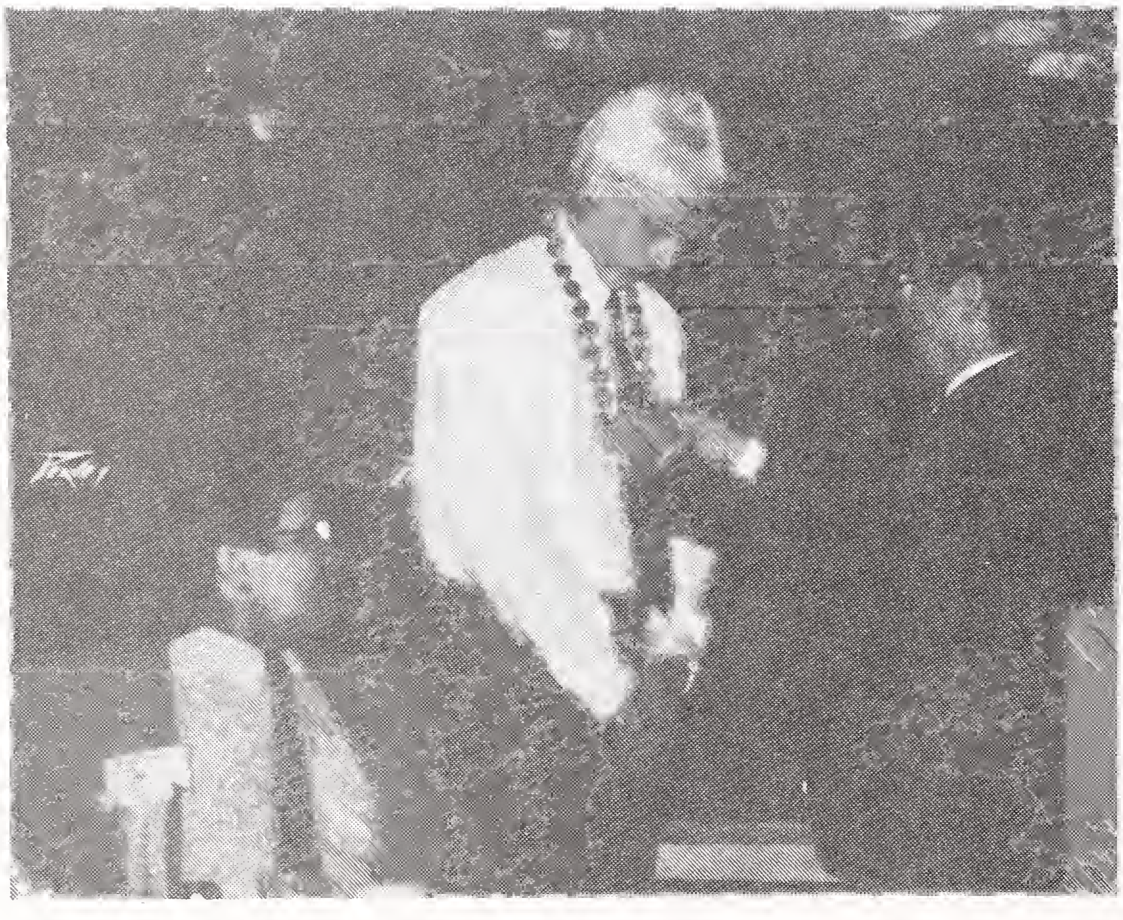
Prestigious awards were presented to Jim Melstad and Scott Anderson, WQD, for their excellent and long-term service to the environment and public health in Montana on behalf of MWEA and MSAWWA. Jim received the Fuller Award and Scott was the Bedell award winner. Congrats, guys!

Conference photos follow . . .

1995 MSAWWA/MWEA Conference photos . . .



Vince Yannone entertains at the Thursday night banquet. Note the bald eagle he is holding, or...is it holding him?



Jim Melstad receives a Fuller pin signifying his award and also a lei of Kona nuts from Manabu Tagamori, of Hawaii, Vice President of AWWA.

1995 MSAWWA/MWEA Conference photos . . .

WEF Treasurer, Dale Jacobson, presents Bedell Award to Scott Anderson. Nice to see you in a tie, Scott!

The 1995 Conference group photo. Do you recognize anyone? And...why are they all smiling??!

1995 MSAWWA/MWEA Conference photos . . .

Henry Elbrecht presents the MSAWWA Small System Award to Dave Wyrick, of Forsyth. Dave also won the "most miles traveled to receive an award" award (Forsyth to Great Falls to Miles City)!

Speeches are over! Now...back to some serious business of the conference, right guys??!!

Montana Section American Water Works Association
Montana Water Environment Association

1996 Joint Conference

CALL FOR PAPERS

The Program Committee has issued a Call for Papers to be presented at the 1996 Annual Conference scheduled for May 1, 2 and 3, 1996 in Missoula. The Conference's technical sessions will be developed from both submitted and solicited papers. Papers should be on a specific subject of interest to Montana's water, wastewater or solid waste handling professionals. Suggested topics include pollution prevention and water conservation; corrosion control in water distribution systems; alternative treatment and disinfection processes; pilot studies for filtration; and biosolids management.

Presentations are typically 20 minutes in length, followed by 10 minutes for discussion and questions. Written papers may be provided to participants and can be more extensive and comprehensive than the 20-minute presentations.

Papers will be chosen from abstracts or ideas submitted on or before **October 14, 1995**. Please complete the submittal form (see following page) and attach a copy of your abstract. Abstracts must be no longer than 500 words in length (two pages, double-spaced) and should include the speaker's name.

If you are not interested in giving a paper but have burning issues you would like addressed, please contact a Program Committee member listed below with your suggestions.

Rick Kerin, Co-chair	444-2406	Pat Burke	444-7343
Bill Bahr, Co-chair	444-5337	Mike Woolridge	265-0355
Craig Brawner	586-3321		

Copies of abstracts or written suggestions should be sent to:

Bill Bahr
Department of Environmental Quality
Water Quality Division
P.O. Box 200901
Helena, Montana 59620-0901

Montana Section American Water Works Association
Montana Water Environment Association

Abstract Submittal Form
(this form must accompany all abstracts)

Title of Paper: ______________________________

____

Speaker: ______________________________

Co-authors: ______________________________

Affiliation: ______________________________

Street Address: ______________________________

City/State or Province/Zip: ______________________________

Daytime Phone: ______________ FAX: ______________

Will this paper be presented elsewhere before May 1, 1996? ______________

If so, where? ______________________________

Audio/visual needs (check items required for presentation):

_____ Slide projector _____ Video _____ Overhead projector

Speaker Biography: ______________________________

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____

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- -

(This section for AWWA/MWEA use)

Assigned Session: ______________________________

Speaker Notified: ______________________________

Notes/Comments: ______________________________

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MONTANA SECTION AWWA SEEKS NEW SECRETARY/TREASURER

by Donna Jensen, MSAWWA

The Montana Section of the American Water Works Association (MSAWWA) is seeking motivated and reliable individuals to run for the office of Section Secretary/Treasurer. This is a 3-year, elected, volunteer term which provides an excellent exposure to the activities and policy-makers of the Montana Section and National AWWA. Nominations for the position will be taken until the position is voted on at the next AWWA/WEA Annual Conference in May, 1996 in Missoula.

Duties of the position include:

- Maintaining financial records and accounts for the Montana Section;
- Recording and distributing Section Board Meeting minutes to Board members;
- Assisting the Section Chair and other members of the Board with agenda items and meeting planning;
- Assisting Committee Chairs with implementing projects that require financial accounting;
- Filing annual reports to National AWWA; and
- Serving as liaison to National AWWA on administrative issues.

The position receives a great deal of assistance from AWWA's National Headquarters in Denver and the Section's part-time Executive Secretary staff at Don Allen and Associates, located in Helena. No accounting background is needed, but basic knowledge of bookkeeping is helpful. Travel to Montana Section Board meetings (currently three times each year, including the annual conference) is important. The position is open to Montana Section AWWA members only, and may be located in any area of the state.

If you are interested in learning more about this opportunity, please contact the current Secretary/Treasurer, Donna Jensen, at (406) 443-3179.

We are also taking nominations for Section Trustee and Donna will be glad to answer your questions about that position as well.

AMERICAN WATER WORKS ASSOCIATION
INDIVIDUAL MEMBERSHIP APPLICATION

Complete this form and mail to:
AWWA/6666 W. Quincy Avenue/Denver, CO 80235
(303) 794-7711 • FAX (303) 795-1989

Have you been a member of AWWA before? ______
When? ______
Member No. ______

Please furnish your preferred mailing address below (indicate whether business or home): ☐ Business ☐ Home

☐ Mr.
☐ Mrs.
☐ Ms. First Name ______ Middle Initial ______ Last Name ______ Suffix
☐ Dr.

Exact Street Address ______ (P.O. Box or Mail Stop)

City ______ State or Province ______ Zip or Postal Code

Title

Company Name

Home Phone ______ Business Phone ______ Business Fax

Applicant's Signature ______ Date

Signature of AWWA Member Endorsing Application (Optional) ______ Endorsing Member Number

Is your company a current member of AWWA? ______ If not, please provide your company's main address if different from above: Company Name ______

Main Business Address

City ______ State/Province ______ Zip or Postal Code

ANNUAL DUES:

$80/Active
Grade Code 02

$35/Operations (formerly Affiliate)
Grade Code 06
(For operator level personnel or employees of small utilities. Will not receive Journal AWWA.)

$25/Student
Grade Code 14
(Requires copy of class schedule.)

ANNUAL DUES $ ______
Special Assessment * ______
Multi-Section Option † ______
TOTAL DUE $ ______

Make check payable to AWWA (Canadian funds add 20%).
☐ MasterCard ☐ VISA ☐ Diner's Club
☐ American Express ☐ Send Invoice
Card Number ______
Expiration Date ______

PREPAYMENT OF ONE YEAR'S DUES REQUIRED
No action can be taken on this application until payment is received.

If you have been a member of AWWA before, indicate dates here:
______

*Mandatory assessments are as follows: If your section is Florida, add $10.00 for 02 active only. In the Georgia section add $15.00 for 02 active only. In the Pacific Northwest add $8.00 for 02 active only. If your section is Minnesota or South Carolina add $10.00 for either 02 active or 06 operations. In the New England Section add $40.00 for 02 active or $17.00 for 06 operations. Enter the total on the line reading "special assessment."

† MULTI-SECTION MEMBERSHIP OPTION

You may also select a year's membership in **other** AWWA sections. Circle your choice(s) and include $14 for each section circled, **except** if your multi-section option includes any of the following: for the New England Section, add $54.00; for Pacific Northwest add $22.00; for Minnesota and South Carolina add $24.00; for Georgia add $29.00. Enter the total on the line reading "multi-section option".

CIRCLE SECTION CHOICES

AKA	ALASKA	IWA	IOWA	†PAC	PACIFIC NORTHWEST
ALA	ALABAMA-MISSISSIPPI	KAN	KANSAS		(OR, WA & WESTERN ID)
ARI	ARIZONA	KNT	KENTUCKY-TENNESSEE	PEN	PENNSYLVANIA
ATC	ATLANTIC-CANADA	MEX	MEXICO	PRT	PUERTO RICO
	(NB, NF, NS, PEI)	MIC	MICHIGAN	QUE	QUEBEC
BRC	BRITISH COLUMBIA	†MIN	MINNESOTA	RMT	ROCKY MOUNTAIN
	(BC, YT)	MOU	MISSOURI		(CO, NM, WY)
CAL	CALIFORNIA-NEVADA	MTN	MONTANA	†SCR	SOUTH CAROLINA
CHS	CHESAPEAKE	NDK	NORTH DAKOTA	SDK	SOUTH DAKOTA
	(DE, DC, MD)	NEB	NEBRASKA	SOW	SOUTHWEST
CON	CONNECTICUT	†NEW	NEW ENGLAND		(AR, LA, OK)
FLA	FLORIDA		(ME, NH, RI, VT, MA)	TEX	TEXAS
†GEO	GEORGIA	NEJ	NEW JERSEY	VIR	VIRGINIA
HWI	HAWAII (GUAM)	NEY	NEW YORK	WEC	WESTERN CANADA
ILL	ILLINOIS	NOC	NORTH CAROLINA		(AB, MB, NT, SK)
IND	INDIANA	OHO	OHIO	WEV	WEST VIRGINIA
INT	INTERMOUNTAIN	ONT	ONTARIO	WIS	WISCONSIN
	(UT & EASTERN ID)				

In some AWWA sections, a portion of the section allotment equal to 50 percent or more of the domestic subscription rate charged for the section periodical will be allocated toward a subscription of that periodical.

ALL APPLICANTS SHOULD COMPLETE THIS SECTION:

Circle the descriptions below that best describe you. The information is used in audits of AWWA readership. Circle only ONE in each group.

BUSINESS AND INDUSTRY
A. Public Water Supply Utility–Municipally Owned
B. Public Water Supply Utility–Investor Owned
C. Governmental—Federal, State, Local
D. Consultant
E. Contractor
F. Private Industrial Systems or Water Wholesaler
G. Manufacturer of Equipment & Supplies including Representatives
H. Distributors of Equipment & Supplies including Representatives
I. Educational Institutions, Faculty and Students, Libraries, and Other Related Organizations
J. Fully Retired
K. Research Labs
L. Unreported

CHECK FIELD(S) SERVED:
5 ☐ Water Supply Only 7 ☐ Wastewater Only
9 ☐ Both 3 ☐ Other

JOB TITLE
A. Executive-Gen'l Mgr., Commissioner, Board Member, City Mgr., Mayor, President, Vice-President, Owner, Partner, Director, etc.
B. Management-Division Head, Section Head, Mgr., Chief Engineer, Comptroller, etc.
C. Engineering/non-managerial-Civil Engr., Mech. Engr. Envir. Engr., Planning Mgr., Field Engr., Systems Designer, etc.
D. Scientific/non-managerial-Chemist, Biologist, Biophysicist, Researcher, Analyst, etc.
E. Purchasing-Purchasing Agent, Procurement Specialist, Buyer, etc.
F. Operations-Foreman, Operator, Maintenance, Crewman, Service Rep., etc.
G. Marketing & Sales/non-managerial-Mkt. Analyst, Mkt. Rep., Salesman, Sales Rep., etc.
H. Other (describe) ______
______

The completion of the following is optional. AWWA maintains profile data for use in developing additional programs and services.

Birth Date ______/______/______

Race/Ethnic Identification: (check one)
☐ 1 American Indian/Alaskan Native
☐ 2 Asian/Pacific-Islander
☐ 3 African American
☐ 4 Hispanic
☐ 5 White (Non-Hispanic)

Gender: (check one)
☐ F Female
☐ M Male

Dues allocated for each publication members receive:
Journal $28 *MainStream* $6 *Opflow* $5

1/95

Montana Section AWWA Director's Report

by Gerald L. Lukasik, P.E.

MSAWWA National Director

Jacqueline and I, along with son Grayson, attended the AWWA National Conference held in Anaheim, California, on June 18-22, 1995. The Board of Directors met in a special session on Saturday, June 17. The regular Board of Directors meetings were held on June 18 and then again on June 22.

The special session was held to discuss five new, major initiatives that confront the association. The initiatives are as follows:

1. Water utility data collection and management. The collection, management and reporting of data required by the information collection rule.
2. The Wolman Institute which would be a center for quality studies and training in utility management, operations and policy.
3. Quality utility service. Utilities would voluntarily commit to industry developed standards of operation, service and water quality. Would have peer review.
4. Public information and education. A program to influence public opinion and counteract negative distortions of environmental extremists.
5. Expansion of AWWA headquarters.

The directors' input on the above will be used in developing more detailed recommendations for board consideration.

At the Sunday meeting, the following items were covered:

1. Financial report. National is in sound financial shape although membership and publication sales have fallen short.
2. The consent agenda, consisting of items of a routine nature, was approved.
3. Officer reports were given as well as Administrative Committee reports, Ad Hoc Committee reports and Council and Forum reports.
4. The 1996-2000 business plan was approved.
5. Plaques were given to outgoing directors.

The Thursday meeting consisted of the following:

1. Treasurer's report.
2. Committee reports.
3. Election of Nominating Committee for Vice-Presidents and Directors-at-Large.

The Anaheim conference set a new record for attendance (approximately 11,800 at last count). A great time was had by all, but it was a welcome relief to return to Montana.

Fluoride and Montana Drinking Water Systems

by Cavin Noddings, Billings WQD Regional Office

The DEQ/Water Quality Division is providing assistance to Montana communities with excess fluoride in their drinking water systems. Fluoride is present in small but widely varying amounts in practically all soils, water supplies, plants, and animals, and thus is a normal constituent of all diets.[1] All public water supplies in this country contain at least small amounts of natural fluoride.[2] Unfortunately, some water supplies contain more naturally occurring fluoride than desired.

During the early 1900's, a local Colorado Springs, Colorado, dentist, Dr. Fredrick McKay, discovered that many of his patients' teeth exhibited a condition which he referred to as "Colorado Brown Stain." He also noticed that these same patients were essentially free of dental caries, or tooth decay. It was later determined by Dr. McKay and others that the element, fluoride, existing in the town's drinking water, was responsible for both conditions.

The benefit of fluoride for inhibiting tooth decay is commonly known, however, it is not commonly known that excessive amounts of fluoride in the diet can cause dental fluorosis, the brown staining and/or pitting of the teeth, or skeletal fluorosis, a crippling bone disorder. For these reasons, the U.S. Environmental Protection Agency (EPA) has set both maximum contaminant levels (MCL) and secondary maximum contaminant levels (SMCL) for the concentration of fluoride allowed in public water supply systems. (The fluoride rule currently only applies to community water systems.) The MCL for fluoride is 4.0 mg/l, and the SMCL is 2.0 mg/l. The level at which the EPA has determined to be an unreasonable risk to health (URTH) is 5.0 mg/l.

Several community water systems in Montana contain naturally occurring levels of fluoride in excess of the optimum range of 0.80 mg/l to 1.20 mg/l, and in excess of the SMCL, MCL, or URTH. Primarily, these systems are located in northeastern Montana, although high fluoride concentrations are found in systems throughout the state. All of these systems rely on groundwater as their source of drinking water.

The DEQ/Water Quality Division is presently working with the high fluoride systems to bring them into compliance with the fluoride regulations. The WQD will initially focus on the systems whose fluoride levels are in excess of the URTH and MCL.

Some systems may be able to find a new source of water for potable use, or blend their primary source with a source of lower fluoride concentration. However, the majority of the systems will ultimately have to provide treatment to remove the fluoride from their water. The EPA designated BAT, or best available technology, for reducing fluoride concentration in water is reverse osmosis (RO), or activated alumina (AA). In addition to reducing fluoride concentration, RO and AA treatment will also reduce the concentration of most inorganics in water.

For further information regarding fluoride regulations, contact the Billings WQD Regional Office at 657-2616 or the Helena WQD, Public Water Supply Program at 444-4549. Also see related fluoride article in this issue of the *Clearwater*.

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1) Hodges HC, Smith FA, *Fluorine Chemistry Volume IV*. Simons JH, ED. Academic Press, New York, NY 1965, p. v.

2) Water Fluoridation, A Manual for Engineers and Technicians, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Dental Disease Prevention Activity Center for Prevention Services, Atlanta, Georgia, September 1986, p. 1.

MWEA DIRECTOR'S MESSAGE

GREETINGS!...on behalf of Barry Damschen, our current national director. At the annual conference in Great Falls, I was selected to follow in Barry's big footsteps as national director. I mean, have you really taken a good look at the size of Barry's shoes? These ARE some big footsteps. Seriously, Barry has been a strong and constant voice on behalf of our Montana group at national conferences and at the regional meetings. The concerns we have taken to these meetings have dealt with a wide range of issues of concern to the Montana Water Environment Association.

We work each year to build our membership, but only a small portion of the dues comes back to Montana. We have looked at a variety of ways to improve our membership and financial numbers. The Joint Annual Conference remains our primary source of revenue for the year. We expend a lot of individual energy to make the conferences as successful as the recent ones have been. Our requests to the Water Environment Federation (WEF) national organization to return a larger portion of the dues to our state association have gone unheeded, so we may propose other options. Nonetheless, we are losing a strong voice at the national level, and I hope I can carry out the duties of this office as well as Barry. Thanks, Barry, for all your fine efforts.

I attended the regional Member Associations (MA) meeting at Breckenridge, Colorado this spring. WEF Vice President, Billy Turner, was at the meeting and directed us to consider ways to implement the eleven strategic initiatives that make up the WEF plan to be the preeminent organization in the water environment field throughout the world. Following our work on these initiatives, we took on the task of identifying ways in which the governance initiative could best mesh with the current organizational structure of WEF. The officers from the national offices will take our comments and those from the other regional meetings and assemble goals and objectives to help achieve the strategic initiatives.

The best part of the meeting, in my opinion, is the MA exchange. We had representatives from Arizona, California, Nevada, New Mexico, Colorado, Hawaii, Alaska, South Dakota, Nebraska, British Columbia and the Pacific Northwest. The MA representatives presented talks on a variety of activities and issues their respective groups were involved in. It is very educational to see that the other MAs do many of the same things we do, for operator and public education, annual conferences, financial and engineering workshops, etc. It is also enlightening to see what the other MAs do differently. In Arizona, the AWEA and the ASAWWA sections have combined. In California, memberships are available to just the CWEA without belonging to WEF. British Columbia is a joint group also, and oversees the certification and training program. Hawaii put together an Operations Challenge Team with a member from each island.

The regional meetings seem to be a good place to express our viewpoints and get them heard. We will likely get to host the regional meeting in 1997. I'd like to hear from you on options to make the meetings fun and exciting, with some fun activities. I think the Flathead Valley would be a tremendous venue for the meetings.

I will get my first taste of the national officer meetings at the WEF Annual conference this fall in Miami. If I don't get carjacked or anything, I'll write a full report on the events of that conference. See you later...Bill Bahr.

Membership Application-1995

☐ Check Here If Renewing

1

Send Completed Application and Payment to:
WEF, Financial Management
601 Wythe Street • Alexandria, VA 22314-1994, USA

For more information, call 1-800-666-0206 in North America or 1-703-684-2452 outside or FAX 703-684-2492

Association Choice: (Please print or type)

Select one from the list on back of this form.

Use this application to join the Water Environment Federation and your local Member Association. Simply complete this application and return it to the address above. Along with your monthly publications, you are also entitled to group insurance, technical assistance, discounts on technical publications, conference registration and much more!

2

First Name, Middle Initial (11) | Last Name (16) | (Jr., Sr., etc.) (3)

☐ Business Address or ☐ Home Address

Business Name (if applicable) (30)

Street or P.O. Box (30)

City (18) | State (2) | Zip Code - (9) | Country (12)

Telephone – Home - - (10) | Business - - (10) | FAX (if applicable) - - (10)

WEF ID#

(If renewing membership)

3

Please refer to facing page when completing this section.

Employer Code (2) Other (please specify)

Job Title Code (2) Other (please specify)

Environmental Focus (2) (2) (2) (2) (2) (2) Other (please specify)

4

WEF Sponsor (Optional) (20)

Sponsor's Member I.D. Number (7)

Source Code (2)
(For WEF Use Only)

5

Membership Categories: Choose one membership category and fill in the appropiate dues.
Note: Retired? Call the WEF Member Services Center at 1-800-666-0206 to find out about our retired membership category.

☐ Active

For individuals involved or interested in the advancement of knowledge pertaining to water quality.

Dues $ ______
Dual* $ ______
Select ONE Included
☐**WE&T or**
☐**Water Environment Research**
Highlights Included
Additional Publications (See box below)
Periodical Code *Cost*
______ $ ______
______ ______
______ ______
______ ______
______ ______
TOTAL $ ______

☐ Operations Division

For individuals working in, or responsible for, the operation of one or more wastewater collection, treatment or laboratory facilities, or for facilities with a daily flow of <1 mgd or 44 L/sec.

Please indicate type of membership below:
☐Individual ☐ Organization/Agency
Dues $ ______
Dual* $ ______
Select One: Included
☐**Operations Forum or**
☐**Water Envionment Laboratory Solutions**
Highlights Included
Additional Publications (See box below)
Periodical Code *Cost*
______ $ ______
______ ______
______ ______
______ ______
______ ______
TOTAL $ ______

☐ Student**

For Individuals enrolled at least half-time in a college or university.

Dues $ ______
Dual* $ ______
Select ONE Included
☐**WE&T,**
☐**Water Environment Research or**
☐**Operations Forum**
Highlights Included
Additional Publications (See box below)
Periodical Code *Cost*
______ $ ______
______ ______
______ ______
______ ______
______ ______
TOTAL $ ______

☐ Corporate

Corporations engaged in the design, construction, operation or management of water quality systems. **One person is entitled to receive Membership benefits.**

Dues $ ______
Dual* $ ______
WE&T Included
Water Environment Research Included
Operations Forum Included
Highlights Included
Water Environment Regulation Watch Included
Additional Publications (See box below)
Periodical Code *Cost*
______ $ ______
______ ______
______ ______
TOTAL $ ______

6 Dual Membership

*If you would like to join more than one Member Association, please incidate which association(s) you would like to join and write the Association's Dual dues (See back of form–last column) in the appropriate box above. WEF will track no more than three additional associations.

Indicate Additional Association(s) Here (No more than three)

Additional Publications

One or more of the following WEF periodicals may be ADDED to your membership package if they are not already included. Please enter the Periodical Code and Cost in the allocated space above.

	Periodical Code	**Cost**
Water Environment & Technology	WET	$40.00
Water Environment Research	RJ	40.00
Operations Forum	OF	25.00
Water Environment Laboratory Solutions	WELS	35.00
Water Environment Regulation Watch	WRW	35.00

**A photocopy of current student ID is required with Application.

7 Method of Payment

☐ Check Enclosed:
Make Check Payable to WEF
☐Charge my: ☐ VISA ☐ MC ☐ AMEX

Account Number | Expiration Date

Signature | Daytime Phone No.

Postage Requirement: Dues allocated for publications when included in membership: WE&T – $40; Water Environment Research –$40; Federation Highlights –$15; Operations Forum – $25; Water Environment Regulation Watch–$35 Water Environment Laboratory Solutions –$35

COMMONLY ASKED QUESTIONS ABOUT WELLHEAD PROTECTION

by Joe Meek, WQD

WHAT IS WELLHEAD PROTECTION?

Wellhead protection (WHP) is a community effort which includes: 1. learning about where the water in your well or wells comes from (called the **Zone of Contribution** or ZOC), 2. inventorying the potential threats to your wells in the ZOC, 3. managing potential pollution threats to your wells, 4. planning for emergencies, and 5. updating to address changes in the community.

Section 1428 of the 1986 Amendments to the Safe Drinking Water Act authorized the establishment of state programs to implement WHP. The U.S. EPA-approved Montana Wellhead Protection Program is a voluntary program designed to encourage and assist PWSs in the implementation of WHP. DEQ (formerly DHES) has outlined a 7-step program which describes WHP from the first contact with a community though DEQ certification to a community's wellhead protection plan. Certification insures that the plan meets a set of minimum criteria and may be the basis for some monitoring requirement waivers assistance in "ground water under direct influence of surface water" (GWUDISW) determinations.

WHY SHOULD AN OPERATOR CARE ABOUT WHP? I DON'T WANT MORE WORK, WHY SHOULD I GET INVOLVED? I DEAL WITH ENOUGH PEOPLE AND POLITICS ALREADY, WON'T WHP BE ANOTHER BURDEN ON ME?

The most effective way for a community to protect their ground water resource is to establish a wellhead protection plan (WHPP). Without WHP, you become reactionary to accidents, emergencies, or other threats to your water supply. WHP is a logical planning process to protect your supply. It is far easier and more effective to consider threats to your supply **before** a crisis arises. It is an old cliche' but **"people don't plan to fail...they fail to plan"**.

The **operator** is generally the first person in line when a crisis arises. Through WHP, identifying your ZOC and potential pollution sources can help prevent the crisis in the first place while pre-planning for emergencies may reduce the stress of such events after they occur.

WHAT ROLE MIGHT AN OPERATOR PLAY IN COMMUNITY WHP?

An **operator** may be one of the first people to see the logic of WHP. In fact, you may be one of the few people in your community truly aware of the impact that the discovery of a serious pollutant in your ground water may cause.

For instance, think about the consequence of discovering a high VOC concentration in your water through routine monitoring. As the **operator**, you'll be the first person likely to react. Assume check sampling shows an increasing level of the VOC...now what do you do...by this time you have become strictly reactionary...you hope that additional sampling will show it is decreasing...but it doesn't...where did it come from...are your other wells threatened...if you must drill a new well, where should it go...can I treat for it...who'll pay for treatment...should I provide bottled water...could I have prevented this from happening?

WHP is the most effective way for a community to protect their ground water resource.

An **operator** may simply request that the local governing body consider WHP, or you may want to arrange a WHP presentation by DEQ or Montana Rural Water Systems (MRWS) to the local governing body. Another option might be to contact a local citizens group with information about WHP to interest the group in expending the effort needed to generate action. **Operator** involvement can range from very little to significant.

MY SYSTEM IS VERY SMALL, WHAT DOES WHP MEAN FOR ME?

Any system that relies on ground water should consider some degree of WHP. Small systems utilizing one to a few wells may establish fixed radii control zones around the well. After identifying possible threats within those zones, the PWS may coordinate with city or county governing bodies or citizens to educate persons living or working within those zones about aquifer protection.

HOW MUCH IS THIS GOING TO COST?
WHERE DOES THE MONEY FOR WHP COME FROM?

Costs associated with WHP vary considerably. The Montana WHPP was designed to make WHP "do-able" by most communities through resources available within the community. Assistance with the technical aspects of WHP is available through the Ground Water Section at DEQ, MRWS, and private consultants. Some communities may have professionals willing to assist with the effort.

DEQ is required to provide ZOC delineations for all PWSs using wells in valley aquifers serving 1000 or more persons. This effort is currently underway and will likely take about two years to complete.

EPA grant money generally is not available, however Treasure State Endowment Funds may be used for WHP integrated with new well construction.

HOW DO I GET MY COMMUNITY INTERESTED IN WHP?

Local initiative is the key to developing a WHPP for a community. Individual communities can best determine how to develop a local program considering local hydrogeological conditions, land uses, and political and economic conditions. An **operator** who decides WHP will benefit his system may start by discussing it with his local governing body or interested citizens. The **operator** may not want to be deeply involved but may want WHP to happen. Educating interested persons in WHP is the best way to get it started.

IS HELP AVAILABLE?

Yes. Contact Joe Meek, DEQ, at 444-4806. You can also call Bill O'Connell, MRWS, at 782-6166.

* * *

HELP WANTED!!

by Rick Cottingham, WQD

The Co-chairs of the Heroism and Safety Committee of MSAWWA/MWEA are looking for the names and stories of persons for consideration of awards for these deeds.

If you know of anyone in Montana who has contributed greatly to the safety and well-being of a community or plant this past year or acted heroically, please write either Rick Cottingham or Tom Slovarp at the Water Quality Division. The address is:

Rick Cottingham or Tom Slovarp
Water Quality Division
Department of Environmental Quality
1400 Broadway
P.O. Box 200901
Helena, MT 59620-0901

Annually the Montana Chapters offer an award presentation at one of the Water/Wastewater Schools in the spring or fall.

Please send the name of the person(s), a brief description of what you think qualifies them, and how we may contact this individual.
As a reward, we'll see that you get the next issue of this publication free and on time.

We know there are many people out there who deserve recognition for their efforts to make these industries a better, safer place to work. Please help us identify them and reward them.

Thanks, and be careful out there!!!

WATER QUALITY DIVISION AWARDED GRANTS

by Pat Burke, WQD

Water Quality Division Develops Lagoon Assessment Document

The Water Quality Division's Municipal Wastewater Assistance Section was recently awarded a $30,000 grant by EPA Region VIII, Denver, which will be used to fund continuation of the Municipal Water Pollution Prevention Program. The grant award was based on a competitive selection process involving EPA Region VIII states. Work performed with these monies will focus on pollution prevention activities for smaller communities, particularly those towns served by wastewater lagoons.

The first grant-funded activity has been development of a self-assessment process for municipal wastewater lagoon systems. The self-assessment is a voluntary program, designed to help communities evaluate the adequacy of their existing wastewater facilities while looking ahead towards future wastewater management needs. The self-assessment consists of a series of worksheets and tables which allow a community's wastewater personnel to evaluate and rate the performance of their wastewater system. The lagoon assessment addresses collection system needs, permit compliance/performance, design considerations, future flow and load projections, biosolids management, and groundwater pollution potential. Based on the cumulative score developed through the evaluation tables, the facility is given a ranking, and the community is requested to develop an action plan to address noted deficiencies.

Continuing education credits are available to operators who complete the self-assessment for their facility. If you are interested in participating in the self-assessment program, please contact Pat Burke at 444-7343 or Bill Bahr at 444-5337.

Water Quality Division Awarded NPDES Grant

The Water Quality Division was recently notified by EPA Region VIII that they have received a $100,000 NPDES grant under Section 104(b)(3) of the Clean Water Act. The grant was obtained through a competitive selection process involving other EPA Region VIII states.

The project will evaluate the impacts of municipal wastewater discharges on the Upper Missouri River and Bitterroot River watersheds. Specific tasks will address waste load contributions from municipal sources relative to background, non-point sources; evaluation of mixing zones and toxicity levels in municipal surface water discharges; and water quality impacts resulting from infiltration/percolation (I/P) systems and leaking wastewater lagoons. A portion of the grant will also be used to fund ongoing work in the Clark Fork River basin by the Tri-State Implementation Council. The project will be initiated during late-1995 and will continue through 1996. Additional information will appear in future editions of the *Clearwater*.

1995 WATER QUALITY LEGISLATION

by Jim Melstad, WQD

Below is a summary of 1995 legislation that will affect programs within the Water Quality Division. Questions should be directed to the appropriate program personnel. The Public Water Supply Program can be reached at 444-4549, the Sanitation in Subdivisions Program at 444-2479, and the Operator Certification Program at 444-2691. The Municipal Wastewater Assistance, Groundwater, Discharge Permits, Enforcement and Watershed Programs can all be reached at 444-2406. Special thanks go to Janet Kessler and WQD Program Managers for putting this summary together.

HOUSE BILLS (HB)

HB 212 - This legislation revised portions of the Montana Pesticides Act (MPA) and the Montana Agriculture Chemical Ground Water Protection Act (MACGWPA). The revisions relate to the Department of Agriculture's investigation and enforcement authority and the assessment of penalties under the MPA. Changes to the MACGWPA eliminated the requirement that detections of pesticides in ground water be reported to the Department of Health and Environmental Sciences (DHES). Also the authority for the DHES to assess administrative civil penalties under the MACGWPA was eliminated because this authority duplicates existing authority provided to the DHES under the Montana Water Quality Act. (EFFECTIVE 7/1/95)

HB 292 - This legislation amends the Sanitation in Subdivision Act to require the reviewing authority, either state or county, to provide a written statement to the applicant of any subdivision that is denied or conditionally certified. The statement must include the reason for denial or condition imposition, evidence to justify that action, and information relative to a process to appeal that decision. (EFFECTIVE 10/1/95)

HB 493 - This legislation creates the MT Safe Drinking Water Revolving Fund Act, a new financial assistance program to provide loans for drinking water systems to build needed facilities. The Act is contingent upon passage of federal legislation which establishes funding for the new program. Funding is provided through federal grants and state match in an 83% to 17% split. State funds are raised through issuance of general obligation bonds with interest on the loans used to pay back the bondholders. The program is designed to be self-supporting and last in perpetuity. With the exception of administrative costs and bond repayment, all payment back to the program will be "revolved" out in the form of new loans. This legislation is based on the existing Wastewater Revolving Loan Program. (EFFECTIVE 4/27/93)

SENATE BILLS (SB)

SB 46 - This legislation modified the metalliferous mines license tax to clarify that 2.2% of the total mines tax collected each year be allocated to the ground water assessment account. This account supports the statewide Ground Water Assessment and Monitoring Program established in 1991 by SB 94. This change will help to ensure stable, long-term funding for this important program to assess and monitor Montana's ground water resources. (EFFECTIVE 2/6/95)

SB 78 - This legislation was submitted at the request of the DHES to address several audit issues. It removes the requirement that the Water Pollution Control Advisory Council meet twice each year and allows it to meet when necessary. It clarifies the agency's authority to reduce the annual waste discharge permit fee for those facilities that consistently meet effluent limits. It eliminated a conflict in earlier legislation relative to the minimum fee that can be charged a permittee. The bill also provides additional flexibility for the agency in enforcement response. The DHES is no longer mandated to take a specific enforcement action in response to every violation and must notify the person of the violation and the required compliance. (EFFECTIVE 7/1/95)

SB 144 - The 1991 legislature closed the Upper Clark Fork River Basin to additional water use permits and created a steering committee to develop a basin management plan. This legislation implements several important recommendations from that plan. It refines and extends the basin closure, continues the steering committee, and creates a pilot program allowing persons to convert or lease existing water rights for instream flow purposes. (EFFECTIVE 4/14/95)

SB 153 - This legislation was submitted at the request of the DHES and amends Montana Laws Regarding Public Water Supply. It includes authority to develop rules regarding a voluntary program for cross-connection control. The legislation clarifies that it is unlawful to operate, as well as construct, a public water supply or sewage system prior to DHES approval of plans and specifications. It clarifies the DHES's authority in the area of wellhead protection allowing the DHES to work with local officials to administer a voluntary program consistent with the Federal State Drinking Water Act. The Wellhead Protection Program must not duplicate State or Federal Programs. The bill also makes the definition of a public water supply consistent with that in the Federal Safe Drinking Water Act. A public system is now one that has at least 15 service connections serving 2.5 or more persons daily for at least 60 days in a calendar year. (EFFECTIVE 10/1/95)

SB 204 - This legislation was submitted at the request of DHES to amend the Montana Law regarding public water supplies in response to an audit recommendation. It establishes criteria that the agency must consider when seeking civil or administrative penalties and makes that language consistent with that in the Montana Water Quality Act. (EFFECTIVE 10/1/95)

SB 289 - The authority of the Department of Agriculture to issue compliance orders under the Montana Agriculture Chemical Ground Water Protection Act to commercial wood treatment facilities and sites where agricultural chemicals are likely to cause contamination of public water supplies was eliminated. Response to contamination incidents at these sites will be handled by DHES programs. (EFFECTIVE 10/1/95)

SB 299 - Local water quality districts (LWQD) may be formed by counties to create and support water programs administered by the local government. A referendum to vote on the formation of a LWQD is required if at least 20% of the owners of fee-assessed units submit written protests. No method for termination of LWQDs was included in the enabling legislation in 1991. SB 299 adds termination procedures to the statute that mirror LWQD formation requirements. If 20% of the owners of fee-assessed units submit a written petition to terminate a LWQD, the county must hold a referendum for the vote of the people to terminate the LWQD. (EFFECTIVE 3/10/95)

SB 330 - This legislation modified the definition of high quality water to exclude some waters from the nondegradation requirements. **The excluded waters include Class III and IV ground waters or surface waters which do not support a designated use, and water bodies which are normally dry for more than 270 days a year.** It also modified the definition of "interested persons" thereby limiting participation in the nondegradation authorization process. In addition, it removed the ability of the DHES to rescind authorizations to degrade and removed the mandatory five year review of such authorizations. (EFFECTIVE 10/1/95)

SB 331 - This legislation made many changes to the Montana Water Quality Act. The major changes include: 1) clarification of provisions for the development of site-specific standards for aquatic life, **2) modification of the definition of state waters**, now making it clear that ponds or lagoons used solely for treatment purposes, as well as land application waters, **are not state waters** 3) incorporation of a requirement for interagency cooperation when a proposed activity requires other state permits in addition to a water quality permit, **4) a requirement for new surface water classifications for streams that, due to sporadic flow do not support an aquatic ecosystem that includes fish species, 5) new human health standards for carcinogens, instead of standards based on a 1 in 1,000,000 risk level, will establish standards based on 1 in 100,000 except for Arsenic where the standard will be based on a 1 in 1,000 risk level, 6) changes in the significance threshold for nitrate in ground water,** generally increasing the allowable change by 2.5 mg/l, **7) a requirement that misclassified waters be promptly reclassified,** 8) requires the Board of Health and Environmental Sciences (BHES) to adopt treatment standards that are cost-effective, economically, environmentally, and technologically feasible, 9) a provision that the department may not require permits for discharges of springs or ground water dewatering unless they contain wastes, 10) requirements for completeness review of all new permits be completed within 60 days, 11) provisions for placement of wastes in a location where they may cause pollution is not prohibited unless they will cause pollution, 12) provisions that civil actions must take place in the county of the violation, 13) requirements for the department to consider the costs voluntarily expended by a violator to address a violation in considering penalties, and 14) in some cases, allowances for the department to seek recovery of investigative costs from a person who complains or alleges that pollution is occurring. (EFFECTIVE 4/15/95)

SB 346 - This legislation was introduced at the request of DHES. It allows for the development of temporary standards in those cases where a water body is not supporting it's designated uses. The temporary standards can only be adopted for those parameters causing the lack of support. The temporary standards can only be adopted if there is a plan and schedule for correcting the problem. The temporary standard cannot be in place for more than 20 years, and the DHES must review progress and report to the BHES at a public meeting every three years. (EFFECTIVE 4/27/95)

SB 362 - Exclusions from Montana Ground Water Pollution Control System (MGWPCS) permits that were listed in MGWPCS regulations were codified by SB 362. The exclusions include oil and gas injection/disposal wells and pits, licensed landfills, permitted hazardous waste facilities, irrigation facilities, storm water disposal or detention ponds, individual household septic systems, coal and hard rock mines with operating permits, and projects reviewed under the Major Facility Siting Act. However, MGWPCS permits are required for public sewage lagoons and infiltration ponds, liquid manure disposal ponds, and for the disposal of industrial waste into shallow disposal wells. The DHES retains its authority to require monitoring at any excluded facility which the DHES determines may be causing a violation of ground water quality standards. (EFFECTIVE 10/1/95)

SB 371 - This legislation specifies that surface waters in national parks and wilderness areas are outstanding resource waters. Under the nondegradation rules degradation is not allowed in outstanding resource waters. It also sets forth a process and criteria for the designation of additional outstanding waters. The process and criteria are very restrictive and it is unlikely that additional waters will be designated. (EFFECTIVE 10/1/95)

SB 415 - This legislation modifies the Environmental Quality Fund to allow private funds to be donated to the DHES to be used to remediate an environmental problem at a specific site. If the donated funds are deemed adequate to address the problem, the DHES will give that site a high priority for remediation. (EFFECTIVE 4/14/95)

The Air Quality Division of Department of Environmental Quality Begins a Project to Determine POTW Air Emission Under Title V, 1990 Clean Air Act Amendments

by Mark Peterson, Air Quality Division

In 1990, Congress passed the 1990 Clean Air Act Amendments (CAAA) which included sweeping air regulation legislation. From these amendments came an air permitting program which would affect many facilities and cause each facility to ascertain and certify its compliance status with regard to all applicable air regulations. This new permit program is known as the Title V Operating Permit program (Title V) and is a separate permit from any other permit you may have for other media (i.e., your NPDES permit).

Title V is applicable to any "major source" of criteria or hazardous air pollutants (HAPs). Publicly Owned Treatment Works (POTWs) and water treatment facilities may be affected by Title V if they are determined to be major sources of air pollutants. To determine if Title V is applicable to your facility, an emissions inventory should be completed and compared to the "major source" thresholds. Major source definitions and emission inventories are discussed below.

What is a "major source"?

A major source is generally defined as any emitting facility which has the "potential to emit" 100 tons/yr of any criteria pollutant, or 10 tons/yr of any single listed HAP, or 25 tons/yr of combined HAPs. The major source thresholds for criteria pollutants may be lower if the facility is located in a nonattainment area, an area which does not meet the National Ambient Air Quality Standards (NAAQS). The criteria pollutants are Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulfur Dioxides (SOx), Particulate Matter (PM), Volatile Organic Compounds (VOCs), and Lead (Pb). There are 189 Hazardous Air Pollutants listed in the 1990 CAAA and include many organics such as Benzene, Xylene, Toluene, and 1,1,1-Trichloroethane.

When determining whether or not your facility is a major source, POTWs only need to include emissions from point sources (emissions through any stack or vent) in their facility. Fugitive emissions (emissions which could not pass through a stack or vent) are calculated only after it is determined that the facility is a "major source".

What is "Potential to Emit"?

Potential to emit is defined as "...the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limitation is federally enforceable." In other words, when calculating emissions from an emitting unit, the emissions should be based on the full capacity of the unit and its operation 24 hours per day 365 days per year (8,760 hrs/yr). Any restrictions on operation, hours of use per year, or credits for control devices must be enforceable by the Environmental Protection Agency (EPA). Usually these conditions are made enforceable through an air quality preconstruction permit.

The Emissions Inventory

To determine whether or not your facility needs a Title V operating permit, an emissions inventory must be calculated. First define what your emitting units are for the facility then calculate the total quantities of each pollutant emitted from each unit. Finally, total all pollutants from each emitting unit and compare to the major source definition.

For example, VOCs and HAPs can be emitted from clarifiers, aeration basins, and biological reactors. Keep in mind that many of these emissions can be fugitive in nature and as such do not need to be included in your "major source" determination. Emissions of VOCs and HAPs are dependant on the organic loading of the inlet waste stream and can be calculated using EPA software programs which are available from EPA's on-line TTN bulletin board service.

Emissions of criteria pollutants can be emitted from a POTW if the facility has engine generators, flares, sewage-sludge incinerators, or boilers. Emissions from these sources can be calculated from emission factors published in EPA documents, test data, or manufacturer's data. To utilize emission factors, the type of fuel burned and the rated capacity of the equipment must be known. If you have any questions on emission inventories, please contact Mark Peterson of the Air Quality Division at (406) 444-3454.

IN SUMMARY . . .

Do I Need A Title V Permit?

If your facility has the "potential to emit," disregarding fugitive emissions, any criteria pollutant or hazardous air pollutant in more than major source threshold quantities, then the facility needs a Title V permit. If your emission inventory shows your point source emissions to be less than major source thresholds, then you should contact the State Air Quality Division (AQD) and verify that Title V is not applicable to your facility. If your facility is a major source, you should submit a Title V application to the AQD by June 12, 1996, or contact the AQD to discuss ways to limit your potential to emit to below the major source thresholds. Applications are available from the AQD by request. You may write to the AQD at the following address:

Mark Peterson
Air Quality Division
Montana Department of
Environmental Quality
P.O. Box 200901
Helena, MT 59620

U.S. EPA REGION VIII
GROUND WATER BRANCH

SUMMARY OF THE MONTANA COMPREHENSIVE GROUND WATER PROTECTION PROGRAM

by Carole Mackin, WQD

MONTANA

Background

In 1984, the EPA developed a ground water strategy with four major objectives: building state capacity, addressing sources of contamination, establishing ground water policy direction and program consistency, and coordinating EPA programs. The strategy led to the 1991 final report of the Ground Water Task Force, *Protecting the Nation's Ground Water: EPA's Strategy for the 1990s*, which laid the foundation for development of a new federal/state partnership called the Comprehensive State Ground Water Protection Program. In 1992, EPA issued guidance and encouraged the states to develop a ground water protection program that covers six strategic areas: goals, priorities, coordination, implementation, data management, and public education.

Montana's ground water goals and strategy were established by the Ground Water Planning Committee appointed in 1994 by the directors of the Department of Health and Environmental Sciences and the Department of Natural Resources and Conservation (DNRC). The committee was charged in Issue 8 of the Integrated Water Quality and Quantity Management Section of the *1992 State Water Plan* to: "develop a ground water plan to coordinate ground water management and identify and address management gaps." In addition, the committee was to: "participate in the new EPA process for developing a comprehensive state ground water protection program."

The Montana Comprehensive Ground Water Protection Program (MCGWPP)

The MCGWPP was adopted by the state April 7, 1995 based on the 1994 *Montana Ground Water Plan.* The program provides for coordination to achieve effective protection of Montana's ground water resource, education of its citizens, and adequate, yet cost-effective, cleanup of ground water contamination. A unique feature of the MCGWPP is that it addresses both ground water quality and quantity. The program has three major components.

1) The MCGWPP seeks to improve public, corporate, and individual decision-making that impacts Montana's ground water.

Montana's ground water is used for irrigation, stock water and industrial development. Over 50 percent of all Montanans depend on ground water for their domestic water supply. In most cases,the ground water is wholesome and plentiful. Yet where ground water is contaminated, the public is becoming aware that the cost of cleanup is often beyond the financial ability of most communities and, sometimes, even the state of Montana. Therefore, citizens need the means to prevent contamination and protect this vital resource. Between 1986 and 1994, the state took great strides in establishing programs protecting Montana's ground water quality and quantity. The objective of the MCGWPP is to coordinate the implementation of these programs, discover gaps, and eliminate duplication.

2) The MCGWPP develops and supports effective ground water education for Montana's citizens that includes information, training, and action.

Ground water education is critical for informed ground water protection. Protection requires prevention, which is accomplished by citizens who are well-aware of the impacts their activities can have on water under the land surface. Informational materials, education programs, technical assistance, and training on basic ground water characteristics, contamination threats, and overdraft potential can inspire effective public action to protect ground water. The objective of the MCGWPP is to coordinate delivery of educational programs and information.

3) The MCGWPP coordinates governmental activities to address adequate, yet cost-effective, clean up of ground water contamination.

State legislation passed in the last 10 years established or enhanced a variety of regulatory programs for solid waste landfills, underground fuel storage tanks, mines, agricultural chemicals, and several other sources of pollution. Due to pollution liability concerns, property assessments to document the degree of contamination that may be present at a site are standard for commercial property sales. As a result, numerous sites with ground water contamination have been discovered in Montana. The objective of the MCGWPP is to ensure that appropriate and coordinated action is taken at those sites.

Administration of the MCGWPP

The Water Quality Division, of the newly formed Department of Environmental Quality (DEQ) will jointly implement the MCGWPP with the Water Resources Division, DNRC. The Ground Water Program of the Water Quality Division will be the primary contact for the EPA, Region VIII, Ground Water Branch and coordinate implementation of water quality recommendations. The Water Management Bureau of the Water Resources Division will be the primary contact for the Montana Legislature through the water planning process and coordinate implementation of water quantity recommendations.

The Ground Water Program of the Water Quality Division administers the Ground Water Pollution Control System regulations, establishes ground water quality standards, issues permits, oversees the cleanup of spills, provides hydrogeologic expertise, assists in permitting mining operations, administers the Wellhead Protection Program and Local Water Quality Districts, coordinates with the Montana Department of Agriculture in implementing pesticides and ground water management plans, assists the Board of Water Well Contractors which is administered by the DNRC, and coordinates with the Montana Bureau of Mines and Geology and the Natural Resource Information System of the State Library to characterize, classify and compile data on Montana's aquifers. The program provides funding for basic research projects and partially funds Water Education for Teachers (*WET* project). Other programs of the Water Quality Division include Safe Drinking Water, Water Quality Management, Nonpoint Source Pollution Control, Water Pollution Control, Water Discharge Permits, and Municipal Wastewater Assistance.

The Water Management Bureau of the Water Resources Division administers the Montana water planning process established by the legislature to identify and prioritize water-related issues and seek a consensus on recommendations for future action. The recommendations are published as the *Montana Water Plan* after each planning cycle. The bureau is also responsible for watershed planning and management, river basin studies, drought management and water conservation, water reservations and basin closures, international and interstate compacts concerning water, hydrologic investigations and technical assistance on water development and water rights, and public education through the *Montana WaterCourse*. The bureau compiles data on water use and availability, and conducts studies on a variety of issues such as irrigation return flow and stream sedimentation. Other programs of the Water Resources Division include Dam Construction and Safety, Floodplain Management, State-owned Hydropower and Irrigation Projects, Water Right Appropriation and Adjudication, and Weather Modification Administration.

The Future

The specific recommendations of the 1994 *Montana Ground Water Plan* will be implemented within the next five years. Each planning cycle of the *Montana Water Plan* will evaluate the progress made in achieving the ground water protection goals and make recommendations for future action. In addition, the goals and strategy of the MCGWPP will provide direction for the reorganization teams to assure effective coordination between the ground water functions of the new DNRC and DEQ. The MCGWPP meets the criteria of a core program and, with EPA assistance, should meet the fully integrated criteria in the near future. The MCGWPP includes specific requests for EPA assistance and flexibility in implementing each of the strategic activities.

THE SURPRISING BUTTE-SILVER BOW WATER QUALITY DISTRICT

by Carole Mackin, WQD Ground Water Section

To no one's surprise, the Butte-Silver Bow Council of Commissioners established the Butte-Silver Bow Water Quality District (B-SBWQD) on May 17, 1995, making it Montana's third district along with the Lewis and Clark County Water Quality Protection District and the Missoula Valley Water Quality District. Even though I've always anticipated that each district would be unique, the B-SBWQD is still surprising in several ways.

First, B-SBWQD will be "self-funding". In other words, the district will not assess a fee on county residents to fund the water quality protection program---money for the first four years comes from ARCO. During this time, the district will pursue grants and other funding sources. In looking at the example set by the two older districts, which have substantially increased their income from such funding sources, I predict that B-SBWQD will always be self-funding.

Second, the water quality protection program for B-SBWQD addresses the largest Super Fund site in the United States. Through the district, the county hopes to assume direct control for the protection of surface and ground water. In addition, they hope to control the use of contaminated water that is a threat to human health. If they are successful, the B-SBWQD will expand water quality district programs into two new areas: management of federal Super Fund sites and management of water rights and water quantity issues. This means that the B-SBWQD will work more closely with EPA and the Department of Natural Resources and Conservation than either of the other districts.

Third, the B-SBWQD was established with almost no controversy. The main issue that developed concerned the status of County Water and Sewer Districts and County Conservation Districts within the B-SBWQD. A few citizens felt that the three types of districts would, at worst, interfere with each other and, at least, duplicate some services. As B-SBWQD's coordinates and integrates its program with the other county districts, the lessons learned should prove helpful to other newly forming districts.

Fourth, the B-SBWQD straddles the continental divide and will protect a portion of the headwaters of both the Missouri and Columbia River Basins. The district includes a large portion of public lands and will interact with both the Forest Service and Bureau of Land Management in implementing its water quality program.

In news from other parts of the state, Gallatin County is asking its residents if they would like to be part of the Gallatin County Water Quality District and several citizen organizations in Ravalli County are evaluating their need for a local water quality district.

For more information about Local Water Quality Districts, contact Carole Mackin at 444-5492 or write Water Quality Division of the Department of Environmental Quality, P.O. Box 200901, Helena, MT 59620-0901.

Water Operator Licenses Revoked

by Rick Cottingham, WQD

The Arkansas State Board of Health upheld the recommendations of the Arkansas Drinking Water Advisory and Operator Licensing Committee and revoked the licenses of two water operators.

Arkansas Drinking Water Update, which is comparable to the ***Big Sky Clearwater***, reported in its June, 1995 issue the names of the operators who allegedly falsified various compliance documents.

The Division of Engineering suspended the licenses in December of 1994, after staff members documented the alleged falsification. Each operator was then offered a hearing before the committee at its January, 1995 meeting. One declined and the other appeared for the hearing at the January meeting. The Committee then upheld the suspension of both licenses and recommended to the Board that the licenses be revoked.

The first operator was then offered a second chance to appear before the Board at its April, 1995 meeting, but he declined again. The Board revoked both licenses.

Falsification of data by operators has become an increasing concern among state agencies throughout the nation and it is felt that action to this extent has to be taken. As a result of the alleged falsification, both Arkansas operators lost their employment in the water industry.

A recent review of the Division of Engineering records specifically for data falsification has caused EPA auditors to question Water Quality Division staff about possible instances of data falsification.

Be careful that what is recorded is accurate...your job, reputation and welfare may depend on accurate and reliable data entry.

WATER AND WASTEWATER OPERATOR CERTIFICATION NEWS

by Shirley Quick, Certification Officer, WQD

Finally, Your New Formula Sheet!

After considerable research and review the new formula sheet used for the operator certification exams has been completed and distributed to all entry level operators. This revision was done with input from the Water/Wastewater Operator Advisory Council, Water Quality Division staff, and other training entities (MRWS and METC).

Although this formula sheet may **LOOK** different than the one we have used in the past, it includes virtually the same information as the old one. **It has just been revised to give you more complete information and should be easier to use to identify the appropriate formula for the appropriate application.**

A copy of the new formula sheet has been sent out to all applicants for the fall examination and to all training providers. Look for a copy of the new formula sheet in this issue of the *Big Sky Clearwater*.

The first sheet of the new three page formula sheet includes definitions of abbreviations that will be used throughout the formulas. That first page also has conversion factors to make solving problems on the exam and on the job a little easier. There are also a few examples to show you how these conversions are used. Metric conversion factors have been included for those of you who must use the metric system on the job.

The second and third pages are broken into categories to make it **easier for you to identify which formula you need to use** to solve a particular problem. For example, if you had a problem to solve that involved hydraulics, you would know to turn to the section headed Basic Hydraulics on the second page.

Just like the old formula sheet, the new one is **designed for ALL CLASSES of water and wastewater operators**, from Class 1 Wastewater Treatment Plant operators to Class 5AB well water system operators. Keep this in mind when using this formula sheet as you may find that there are more advanced formulas included on this formula sheet than you may need for your use.

On a final note, it seems that rumors have been spreading that examinees will have to memorize this new formula sheeet. **That is only a rumor! Examinees DO NOT have to memorize these formulas**, this same formula sheet will be included in the examination booklets for reference during the examination process, just as the old one always was.

As always, if you have any questions about this formula sheet, the exam process, or anything to do with operator certification, please call me at 444-2691.

CEC Due Date is June 30, 1996

By the time you read this, the CEC two year training period will be winding to a close. Start shopping now for some applicable training to earn those CECs and avoid the rush! Your CEC information sheet will be mailed out to you in January or February of 1996 to give you the latest on how many CECs you still need to earn. Remember, **June 30, 1996** is the last day to earn CECs - unless you really WANT to retake that examination!

CEC Survey Results

We had an UNDER-whelming response to the survey that was published in the Spring 1995 *Clearwater* asking for your opinion on whether we should change the CEC units to 1.0 for ONE hour as opposed to the 1.0 for TEN hours it is now. Even after a call for responses by MRWS in their newsletter, we still only received one response. A big round of applause goes to **Art Adamson** of Shelby who responded: "Leave the present CEC policy as it is. Fractions are OK. If we can't figure it out we shouldn't be certified." We agree with Art, the CEC policy remains as is.

Exam Results

We have heard a lot of complaints about the length of time that it took to inform the examinees of the March exam of their test results. As you have heard me complain before, I am the only person in the certification office most of the time and this spring was lonelier than most.

I would love to be able to notify you of your exam results immediately, but until there are more working hands here in the certification office, a wait of six to eight weeks will be the norm. Thanks for your continued patience.

Attention! Contract Operators

As we all know, Montana is growing and so are opportunities for operators who want to contract to run several small systems. To alleviate any problems that may occur from being the operator for more than one system, please supply the certification office with the following information: **a copy of your signed contract with each system, the name of your backup operator(s), and a copy of your backup operator program plan**. For more information, contact Rick Cottingham (444-4769) or Shirley Quick (444-2691).

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MATH REVIEW FOR CERTIFICATION EXAM

The Water and Wastewater Operator Certification Office is sponsoring a Math Review on **Thursday evening, September 28, 1995 from 6:30 - 9:30 pm in Bozeman**, at the Montana State University Strand Student Union Building. The review will be presented by: **Rory Schmidt**, MRWS and **Doris Roberts**, MSU-Northern.

This session is intended to review basic math for those people with valid applications for the exam being given on Friday, September 29. **You will never learn everything you need to know at a water school to pass the exam OR to be a competent operator.** The study materials we provide and suggest are designed for self study.

Also at the Water School in Bozeman, September 25-28, 1995 there will be sessions available each day to answer questions you may have from your self study, and to give you an overview of information. Look inside this issue of the *Clearwater* for more information on the Water School in Bozeman.

Since these sessions are designed for entry level operators, **no CECs will be given** for any of these sessions, either for the Thursday evening session or the ones available at Water School. For more information contact Shirley Quick, Water/Wastewater Certification Office, Water Quality Division, 444-2691.

FORMULA SHEET

Abbreviations:

in = inches
ft = feet
in^2 = square inches (sq. in.)
ft^2 = square feet (sq. ft.)
ft^3 = cubic feet (cu. ft.)
hr = hours
min = minutes
sec = seconds
d = days
lb = pounds
gal = gallons
MG = million gallons

gpm = gallons per minute (gal/min)
cfs = cubic feet per second (ft^3/sec)
gpd = gallons per day (gal/d)
MGD = million gallons per day
ppm = parts per million
mg/L = milligrams per liter
hp = horsepower
psi = pounds per square inch
kWh = killowatt hours
kW = kilowatts
kPa = kilopascal
Nt = Newton

Conversion Factors:

Length: 12 in = 1 ft
5280 ft = 1 mile
Area: 1 ft^2 = 144 in^2
1 acre = 43,560 ft^2
Volume: 1 ft^3 = 7.48 gal
1 acre-foot = 0.326 MG
Time: 1 min = 60 sec
1 hr = 60 min
= 3600 sec
1 d = 24 hr
= 1440 min
= 86,400 sec

Flowrate
1 cfs (ft^3/sec) = 448.8 gpm
1 MGD (million gallons per day) = 1.55 cfs
1 MGD = 694.4 gpm
1 gpm = 60 gal/hr = 1440 gal/day
1 gal/hr = 24 gal/d

Power & Energy
1 kW = 1.341 hp
1 hp = 33,000 ft-lb/min
= 550 ft-lb/sec
1 kW-hr = 2.655 x 10^6 ft lbs

Metric Conversion Factors:

Length:
1000 mm = 1 m
100 cm = 1 m
1000 m = 1 km
2.54 cm = 1.0 in
1.0 km = 0.62 mi

Volume:
1000 mL = 1.0 L
1.0 m^3 = 1000 L
3785 mL = 1 gallon
2.63 mL/min = 1 gal/d

Weight or Mass
1.0 kg = 1000 g
1.0 g = 1000 mg
1 kg = 2.20 lb

Concentration
1 mg/L = 1 ppm

Force and Pressure
1 Nt = 0.115 lb (force)
1 kPa = 0.146 psi (pressure)

Temperature: T(°F) = T(°C) x 1.8 + 32.2

T(°C) = (T(°F)-32.2) / 1.8

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examples:

$$\textit{time (days)} = \frac{\textit{time (min)}}{1440\ \textit{min/day}}$$

$$\textit{Area } (\text{in}^2) = \textit{Area } (\text{ft}^2) \times 144\ (\text{in}^2/\text{ft}^2)$$

$$Q\ (\text{ft}^3/\text{sec}) = Q(\textit{MGD}) \times 1.55\ (\textit{cfs/MGD})$$

$$\textit{Energy } (\textit{kW-hr}) = \frac{\textit{Power } (\textit{hp}) \times \textit{time } (\textit{hr})}{1.341 (\textit{hp/kW})}$$

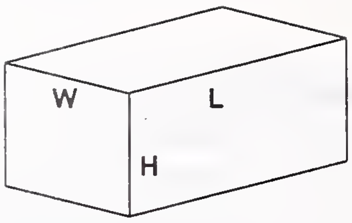
$$v\ (\textit{ft/sec}) = \frac{Q(\textit{gpm})}{A(\textit{ft}^2) \times 448.8 (\textit{gpm/cfs})}$$

where v is velocity, Q is flowrate, and A is area.

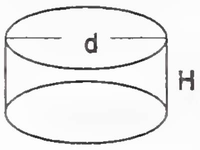
$$\textit{Detention time}(\textit{hr}) = \frac{V(\textit{ft}^3)}{Q(\textit{cfs}) \times 3600(\textit{sec/hr})}$$

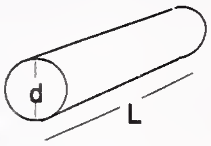
$$\textit{Elevation } (\textit{ft}) = \textit{Pressure} (\textit{psi}) \times 2.31\ (\textit{ft/psi}) + \textit{line losses} (\textit{ft})$$

Geometry



Rectangular tank:
Area = *length x width (top)*
= *height x width (vertical cross-section)*
Volume = *length x width x height*





Circular tank:
Circumference = $\pi \times d$ or $3.14 \times d$
Area = $(\pi/4) \times d^2$ or $0.785 \times d^2$
Volume = $(\pi/4) \times d^2 \times H$ (tank)
= $(\pi/4) \times d^2 \times L$ (pipe)

NOTE: If all dimensions are in feet, area will be in ft^2 and volume in ft^3. For pipes, convert pipe diameter to dimensions of *feet* before using the above formula.

Basic Hydraulics

Detention and Delivery Times:

$$\text{Detention time (min)} = \frac{\text{Tank capacity (gal)}}{\text{flowrate (gpm)}} \qquad \text{Detention Time (days)} = \frac{\text{Tank capacity (Mgal)}}{\text{flowrate (MGD)}}$$

$$\text{Delivery time (hr)} = \frac{\text{Pipe Length (ft)}}{\text{Flow Velocity (ft/sec)} \times 3600\ (sec/hr)} = \frac{\text{Pipe Volume } (ft^3)}{\text{Flowrate (gpm)} \times 8.02\,(ft^3/hr/gpm)}$$

$$\text{Flowrate } (ft^3/sec) = \text{Velocity (ft/sec)} \times \text{Area } (ft^2) \qquad \text{Velocity (ft/sec)} = \frac{\text{Flowrate (cfs)}}{\text{Area } (ft^2)}$$

or $Q = v \times A$, where Q is flowrate, v is velocity and A is cross-sectional area.

Specific capacity (of a well):

$$\text{Specific capacity}\left(\frac{gal}{ft\,d}\right) = \frac{\text{Pumping rate(gal/min)} \times 1440\ min/d}{\text{Drawdown in well (ft)}}$$

Force, Pressure, and Water:
Water weighs 8.34 lb/gal or 62.4 lb/ft^3.
A column of water 2.31 feet high exerts a pressure of 1.0 psi at its base.
A column of water 1.0 feet high exerts a pressure of 0.433 psi or 62.4 lb/ft^2 at its base.

Force (lb) = *Pressure (psi) x Area* (in^2), *or Pressure (psi) x Area* (ft^2) *x 144* (in^2/ft^2)

Line Losses (ft of water) = *Head Loss Rate (ft of water per ft) x Pipe Length (ft)*

Concentration, Dose and Volume

(NOTE: ppm = mg/L)

dosage (lb) = *concentration (mg/L) x volume (MG) x 8.34*

$$mg/L = \frac{lbs}{MG \times 8.34} \qquad MG = \frac{lbs}{mg/L \times 8.34}$$

lb/day = *mg/L x gpm x 0.012*

$$C\ (mg/L) = \frac{C_f\,(mg/L) \times Q_f\,(mL/\text{min})}{Q\ (gpm) \times 3785\ mL/gal}$$

where C is the final delivered concentration, Q is the total flowrate treated, C_f is the concentration in the feed solution, and Q_f is the rate of feed solution addition. This formula assumes zero concentration in the water prior to adding the feed solution.

Efficiency and percentage:

Removal efficiency:

$$\%\ removal = \frac{(C_{in} - C_{out})}{C_{in}} \times 100\%$$

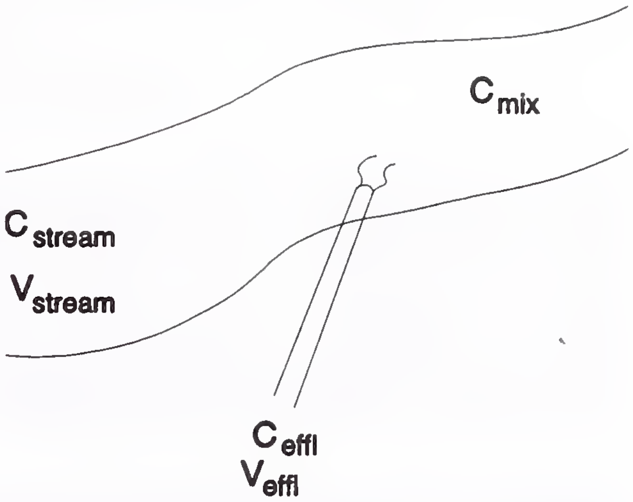
Chemical delivery:

$$Chemical\ delivery\ (\%) = \frac{lbs\ active\ compound\ delivered}{lbs\ raw\ chemical\ used} \times 100\%$$

Discharge to a Stream:

$$C_{mix} = \frac{(C_{stream} \times V_{stream}) + (C_{effl} \times V_{effl})}{V_{stream} + V_{effl}}$$

Where C is concentration and V is flowrate. Note that all flowrates must be in the same units, and all concentrations must be in the same units (e.g., cfu/ml, mg/L, lb/gal). This formula assumes complete mixing of the effluent with the stream.



Hydraulics and Loading Rates:

Surface Settling Rate, upflow rate, or Hydraulic Loading Rate (HLR):

$$HLR\left[\frac{gal}{ft^2 \cdot d}\right] = \frac{Total\ flow\ (gpd)}{Water\ Surface\ Area\ (ft^2)}$$

$$HLR\left[\frac{ft^3}{ft^2 \cdot \text{min}}\ or\ \frac{ft}{\text{min}}\right] = \frac{Total\ flow\ (ft^3/\text{min})}{Water\ Surface\ Area\ (ft^2)}$$

$$Weir\ Loading\ Rate\left[\frac{gal}{ft \cdot d}\right] = \frac{Total\ Flow\ (gal/d)}{length\ of\ weir\ (ft)}$$

$$Organic\ Loading\ Rate\ (lb\ BOD\ per\ day\ per\ ft^2) = \frac{BOD\ (mg/L) \times Flowrate\ (MGD) \times 8.34\ lb/gal}{Area\ (ft^2)}$$

Pump horsepower requirements:

P is pump horsepower, Q is flowrate, H is pump head (pressure) and E is pump/motor efficiency. Note that efficiency is used as a fraction, not a percentage, in these formulas. Use the formula that matches your units.

$$P(hp) = \frac{Q(gpm) \times H(ft)}{3960 \times E}\ or\ \frac{Q(gpm) \times H(psi)}{1714 \times E}\ or\ \frac{Q(cfs) \times H(psi)}{3.82 \times E}\ or\ \frac{Q(MGD) \times H(ft)}{5.7 \times E}$$

Specific Gravity

$$S.G. = \frac{Density\ of\ Solution\ (lb/ft^3)}{Density\ of\ Water\ (lb/ft^3)}$$

DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION
COGSWELL BUILDING
1400 BROADWAY

MARC RACICOT, GOVERNOR

STATE OF MONTANA

(406)444-4549
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PO BOX 200901
HELENA, MONTANA 59620-0901

EXAMINATION NOTICE
FRIDAY -- SEPTEMBER 29, 1995 -- 8:30 A.M. TO 12:30 P.M.

Examinations have been scheduled on the above date for certification as a **Water Distribution Systems Operator, Water Plant Operator, and Wastewater Plant Operator** at the following location:

STRAND STUDENT UNION
MONTANA STATE UNIVERSITY - BOZEMAN

The examinations will be given at the conclusion of the annual Water School which is jointly sponsored by the Water Quality Division, Montana Environmental Training Center, and Montana State University. Please contact the certification office for information on the Math Review that will be free for all pre-registered examinees in Bozeman on Thursday evening, Sept. 28, 1995. The Water School being held on the MSU campus September 25-28 will include basic training for entry level operators. Attendance at the school is not mandatory, but is recommended. **Pre-registration is requested for Water School (call MSU 994-6683). Fees for the school are payable to MSU with pre-registration.**

By September 14, everyone taking these examinations must have:

- Completed and returned an application for certification as a water/wastewater operator.
- Paid application fees for fiscal year 95 which ends June 30, 1996.
- Submitted examination registration slips and fees of $5 per examination. (Combination examinations 2A3B, 3A4B, 4AB and 5AB require $5 examination fee only.)

APPLICATION FEES ARE: $30 for either or both water distribution or water treatment type and classification; and $30 for any wastewater type and classification.

To register for this exam, detach and mail the registration slip to the following Helena address. To ask for additional information, call Shirley Quick at the Helena certification office at 444-2691 or write:

Water/Wastewater Operator Certification
Water Quality Division - P.O. Box 200901 - Helena 59620-0901

PLEASE RETAIN THE UPPER PORTION OF THIS NOTICE

- -

EXAMINATION REGISTRATION SLIP

(Mark which exam you will be taking, detach and return with the $5 exam fee by September 14, 1995)

Type	Class	1	2	3	4	5
Water Distribution	A	_____	_____	_____	_____	_____
Water Plant	B	_____	_____	_____	_____	_____
Wastewater Plant	C	_____	_____	_____	_____	

NAME: ______________________________ SYSTEM: ______________________________

ADDRESS: ____

[Objects of revenue: exam 5002, water app (A&B) 5005, wastewater app (C) 5006]

"AN EQUAL OPPORTUNITY EMPLOYER"

PASSING EXAMINATIONS FOR
FULL CERTIFICATION or OPERATOR-IN-TRAINING (OT) 3/18/95

NAME	**CITY**	**CLASS**	**NAME**	**CITY**	**CLASS**
COURTNEY, GLEN	Havre	1Bot,1Cot	MANAGHAN, SCOTT	Havre	1Aot,1Bot
FISHER, STEVEN	Butte	1Bot	MILAM, DAVID	Havre	1Cot
FORNEY, PAT	Hardin	1B	OVERCAST, JOHN T.	Havre	1Bot,1Cot
GERSCH, LARRY	Canyon Ferry	1B	PAUGH, RICHARD	Chinook	1A
HAHN, DOUGLAS	Havre	1Aot	PEDERSEN, KAREN	Havre	1Bot
HAMRY, LARRY	Butte	1Bot	SEYMOUR, SCOTT	Ramsay	1Cot
LENDWAY, VICTORIA	Havre	1Cot	VANANTWERP, MARK	Bozeman	1Bot
POURROY, BRAD	Conrad	1B			
BLOOD, ROBERT	Lewistown	2A3Bot	PEARSON, MIKE	GNP	2Cot
CHAPPELL, WAYNE	Chinook	2Cot	PICKETT, DAN	Pinesdale	2B
CURETON, JOHN	Kalispell	2A	ROACH, MARK	Billings	2B
FOURTNER, STEVE	Forsyth	2A	SCOVEL, LANNY E.	Kalispell	2A
GREGORY, DAN S	Glacier	2Cot	TABB, WALTER	Coram	2B
NUTTALL, MICHAEL	Pinesdale	2Bot	WALLACE, WILBUR	Glendive	2A
PEARSON, MIKE	GNP	2Aot,2Bot			
CARLSON, LYLE	Fairview	3A4Bot	PALMER, RAY	Butte	3C
CASTEEL, DAVID	Lakeside	3C	PICKETT, DAN	Pinesdale	3A
CHRISTIAENS, JAMES	Choteau	3A4Bot	ST. MARK, WILLIAM	Box Elder	3Cot
GREGORY, DAN S	Glacier	3Cot	ST. PIERRE, TOM	Rocky Boy	3A
HONRUD, DON E.	Fort Benton	3A4Bot,3Cot	TABB, WALTER	Coram	3C
KRAMER, DANIEL	Charlo	3Cot	TRACY, LARRY	Olney	3A4Bot
LOWRY, LORIN N.	Cut Bank	3Cot	WASSER, CHUCK	Harlem	3A
AUGARE, STEVE	E Glacier	4Aot	PETTENGILL, DAVID	Coram	4ABot
BRYANT, SHAWN	Hardin	4AB	QUALLEY,CHARLOTTE	Brockton	4ABot
CORSNER, ROBERT	Lincoln	4C	RIDDLE, JOHN	Lame Deer	4C
FOLTYNEWICZ, RITCH	Vaughn	4Cot	SCHEELER, JOE	Clancy	4C
KEYS, DARYL	Ft Peck	4C	SLOAN, CLAY	Pablo	4C
KLICK, BRUCE	Simms	4Cot	SPENCER, PHIL	Libby	4ABot
LINDBERG, MARK	Simms	4C	SWARTZ, RAY	Great Falls	4ABot
MALKUCH, TINA	Kalispell	4AB	WEGNER, GREG	Hardin	4AB
PALMER, RAY	Butte	4AB	WOOD, GREG	W Glacier	4ABot
PEARSON, MIKE	GNP	4ABot			
DIERKEN, GRETCHEN	Bonner	5AB	PATTERSON, DAVID	Helena	5AB
ERICKSON, ERIC	Ingomar	5AB	PENDLETON, JOHN	Corvallis	5AB
FASSIO, AMANDA	Missoula	5AB	PERSINGER, S. ELAINE	Col Falls	5AB
GRAF, DICK	Whitefish	5AB	RUSSELL, DANIEL	Missoula	5AB
HAACK, LEROY S.	Billings	5AB	SCHEELER, JOE	Clancy	5AB
HANSEN, NEILS	Missoula	5AB	SPURLOCK, KENNETH	Missoula	5AB
HINTZ, MELINDA	Missoula	5AB	TJADEN, DONALD	Lakeside	5AB
JOHNSTON, DOUGLAS	Hamilton	5AB	WIPF, TIM	Gilford Col	5AB
LANDQUIST, MICHELE	Lolo	5AB	ZUCKER, HARVEY	Troy	5AB
LANDIS, DONNA	Whitefish	5AB			

Water Quality Division
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